MODEL AIRPLANE NEWS

12th Year of Publication

SEPTEMBER, 1940

20c

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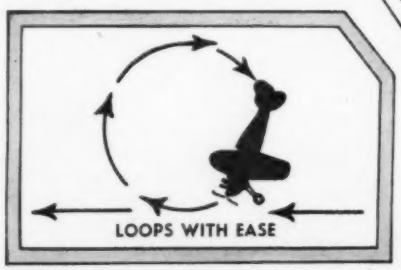

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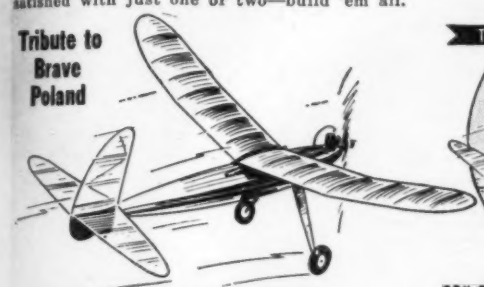

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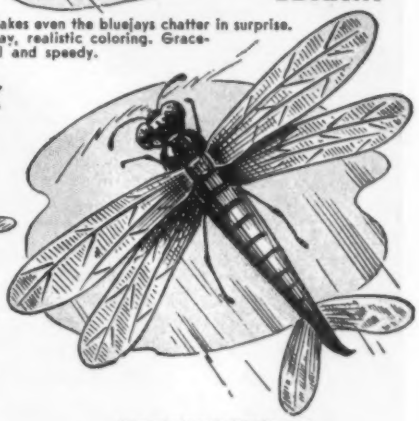

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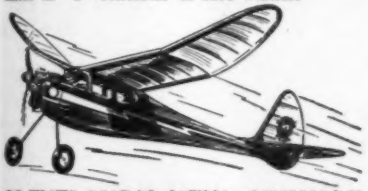

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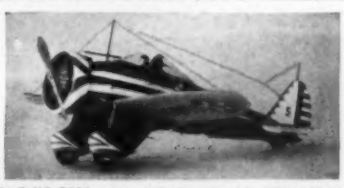

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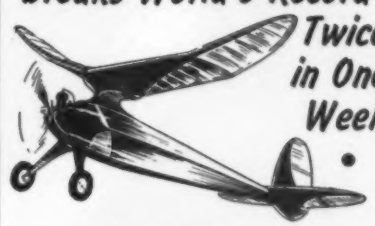

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Model AIRPLANE News

12th YEAR OF PUBLICATION

VOL. XXIII *No. 3*

Edited by Charles Hampson Grant

CONTENTS

SEPTEMBER, 1940

Uncle Sam Buys A Model Plane
By Douglas J. Ingells 8

Fundamentals Of Gas Model Engines
By Charles Hampson Grant 10

Elements Of Radio Control
By Howard McEntee 11

A Winning Contest Seaplane
By James Jensen 12

The Nationals On Parade
By The Editor and A. G. Davis 16

Consolidated XB-24 (3 View) 22

The Greatest Bomber In the World
By Robert McLarren 23

Simple Plastics for Models
By L. A. Williams 23

The Grumman Mono-Pursuit
By Herbert K. Weiss 24

The Physics of the Airplane
By Lt. James Eames and Willis L. Nye 28

Frontiers
By Robert Morrison 29

Building the Falcon
By Paul Plecan 30

Good Eyes—Fine Work
By E. K. Smith, O.D., as Told to F. Conde Ott 34

Flash News 35

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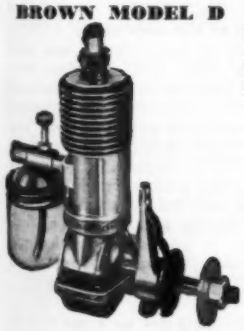

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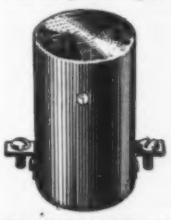

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Captain G. V. Holloman adjusts parachute installation on radio controlled target plane

UNCLE SAM BUYS

High Lights of a Radio Controlled Model Plane Developed at Wright Field for Use As an Aerial Target

By DOUGLAS J. INGELLS

BACK in July, 1925, visitors at Wright Field, aeronautical research center in Dayton, Ohio, were very much perplexed when they saw a small car moving about the grounds without visible means of control.

"Something wrong here," thought the onlookers, "cars don't just run by themselves. Say, what is this . . . ?"

There was no doubt about it, that "driverless" car caused great concern. Actually, however, the car had a pilot, but he wasn't inside.

What happened was this:

That small car was under perfect guidance, being operated by radio control from an airplane flying at 2,000 feet.

Put that in reverse, let the moving car on the ground control a tiny plane in the air, and you have an up-to-the-minute headline—RADIO CONTROLLED AIRPLANES.

Today, fourteen years after that "mystery car" made its first public demonstration of automatic radio control, aeronautical experts at Wright Field are experimenting with a new radio controlled airplane. And they hope this small ship will prove satisfactory as a target for training pursuit pilots in aerial machine gunnery.

The plane around which these new experiments are centered is far from being a full sized airplane. It is about one-third the size of an ordinary combat ship, with a wing spread of twelve feet, but it has a real gasoline motor and its controls work on the same principle as those on a regular airplane except that it is operated by radio control.

Primarily the model is designed to serve as a target, replacing the sleeve-type tow-target found unsatisfactory because it lacked maneuverability and did not simulate an airplane in flight.

Radio installations comprised of intricate mechanisms placed in the small plane are the secret of its control.

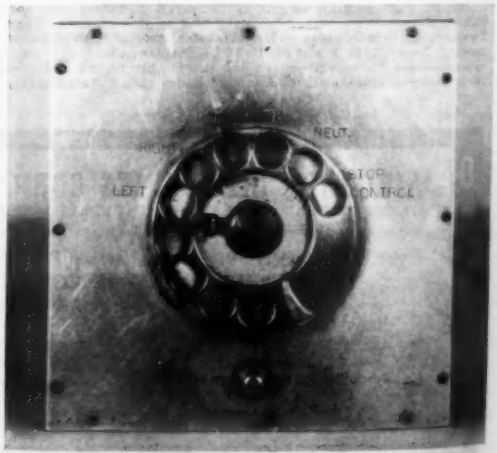
Although the target model is launched from a catapult it can take off on its own power, according to those working on the experiments. It can climb to a ceiling of 5,000 feet and still maintain its "ground control" by means of radio frequencies.

Aside from the actual radio control apparatus, which is one subject army engineers refuse to talk about, the outstanding feature of the model is its small engine. Unlike most small-motored model planes, this ship has a twin-propeller arrangement. Both blades run on the same shaft by means of gears, but they revolve in opposite directions, thus creating a greater pulling power for the plane.

When the model has completed its mission as a target, a radio contact from the rheostat operator on the ground releases a small parachute from the plane and floats it gracefully to earth. The catapult launching method and the parachute descent are advantageous because they permit the operation of the model in a minimum of space.

It is not necessary that the model be lowered by its pick-a-back chute inasmuch as the radio control operator can land the ship by operating his "dial control." The dial control looks very much like a dial on the telephone, but it holds the control "contact points" which enable the model to react just as a large plane. Banks, climbs, dives and almost every other flight maneuver can be accomplished by a series of contacts from the ground operator, reaching the model through short wave frequencies.

In this way the plane, when it is in flight, greatly resembles a moving airplane target and serves as a "good test" for anti-



Dial on the control box for radio target plane

Making last minute preparations before launching the plane. Note catapult, also twin propellers

A MODEL PLANE

aircraft gunners on the ground. The model is fitted to a portable truck especially designed with radio equipment for use with the experiments. It can be transported from various fields to other locations and thus serves as a mobile unit.

Army men say that the target is cheaper than the tow-target used at the present time by them, and "much less dangerous" inasmuch as the tow-target must be towed by an airplane and there is the slight chance that shells might "go astray."

However the model, which is almost an exact replica of some of Reginald Denny's radio controlled jobs—the army actually bought twelve models from Denny sometime ago at a price of $1,000 each—does not appear to be just an "inexpensive toy."

Those familiar with the tests claim that the most difficult problem was getting the ship to land itself. This, they said, was because once the plane lost its motivation in the air the weight tended to "throw wave frequencies off" and thus made the control difficult.

In charge of the tests with the target model are capt. George V. Holloman, Capt. Rudolph Fink and Lawrence Shanabrook. Capt. Holloman was presented the Distinguished Flying Cross by Maj. General Henry H. Arnold, Chief of the U. S. Air Corps, on August 2nd at the air corps birthday party at Wright Field, for his part in the "development of the first automatic landing in an airplane."

"The small target model must in no way be associated with the

(Continued on page 57)

The motor has stopped, the parachute has been released and the plane slowly descends

The aerial target plane is transported from place to place securely mounted on top of the control car, as shown

The model climbing steeply after the take-off, on one of its first test flights at Wright Field

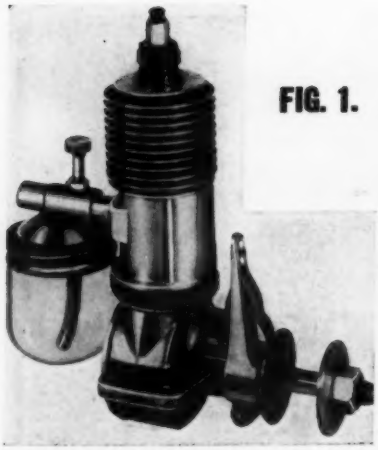
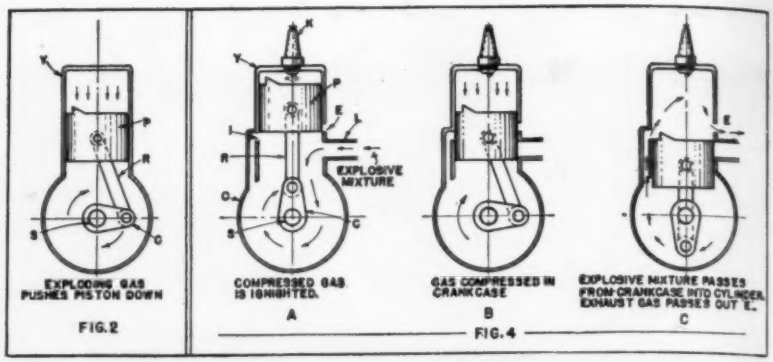


FIG. 1.



Fundamentals of Gas Model Engines

By CHARLES HAMPSON GRANT

TO POWER a model plane with a real gasoline engine, like a full scale airplane, was the dream of model builders for many years during the pioneer phase of aviation. Today this dream is a reality. For years experimenters struggled with the problem of producing a small, light but powerful gas motor that would serve as a practical power plant for model planes. The problems of design and construction were solved gradually, one by one. Now model gas engines are sold and used universally. A typical motor of the two cycle type is shown in Fig. 1.

Rubber band motors are by far the simplest type that can be used but the power delivered varies over the period of flight, their power output is of comparatively short duration, the motor run cannot be governed and their weight is not concentrated. Because of the latter the rubber powered model cannot readily assume the proportions and balance of full scale aircraft.

A gas motor provides all of these advantages. Its chief disadvantage, compared to rubber power, is difficulty of operation. Gas motors are temperamental, often running erratically and sometimes refusing to operate at all. To have a motor perform consistently and reliably the model flier should be able to install it properly and understand thoroughly how to adjust the numerous units upon which the operation of the motor depends. This requires a knowledge of the basic principles of motor functioning and construction. The following explanation therefore will prove extremely helpful.

The power of a gasoline motor is derived from burning an explosive mixture in a confined space: A cylinder, into one end of which a piston fits snugly. This piston can move freely back and forth within the cylinder. The explosive mixture used is a combination of vaporized gasoline and air in proper proportions. When this is burned within the cylinder of an engine the burning gas expands with great force because of the great intensity of heat developed.

The pressure of the white-hot gas is exerted against the head of the piston forming one end of the space in which it is confined. This tends to drive the piston out of the cylinder. Fig. No. 2 shows a cutaway diagram of a gas engine. The gas in the cylinder has been ignited and the pressure generated is pressing down on the piston head P (indicated by the arrows). One end of the connecting rod R is attached pivotally to the piston, the other end to the crank C of the engine shaft S. As the piston is forced down it pushes on the upper end of the connecting rod, forcing it down also. The lower end of the rod operates on the crank C to turn the shaft S.

When the crank C reaches the bottom of the circle in which it rotates, the piston has reached its limit of downward motion. It moves upward again as the crank moves along its circular path to its highest point. Thus as the piston moves down under the impulse of the explosion the crank turns, forcing the piston up again after it has passed the bottom of the stroke so that it will be ready for the next explosion when the piston has reached the top of its stroke. At the bottom of each stroke the burned gases are released from the cylinder through an exhaust pore or valve so that the down pressure on the piston is relieved and it rises freely under the push of the connecting rod to the top of its stroke.

Thus the piston moves back and forth in the cylinder as the crank revolves and it becomes evident that explosions must take place intermittently to push the piston in only one direction, the pressure on the piston being relieved on the back stroke.

A definite cycle of actions must take place with every revolution in order to have the engine operate efficiently. If these actions are known, the design of the mechanism required to insure correct functioning can be determined. They are as follows, in the order in which they should take place.

First, the explosive mixture enters the cylinder; second, it must be compressed to make it explode and burn easily; third, it must be ignited; fourth, the gas expands, pushing down the piston; fifth, the burned

(Continued on page 38)

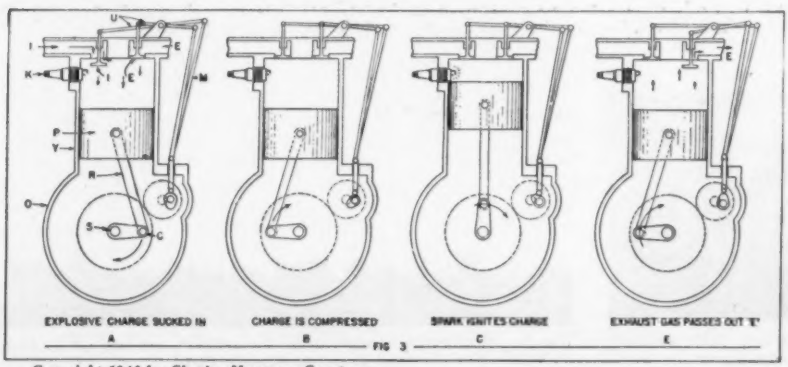
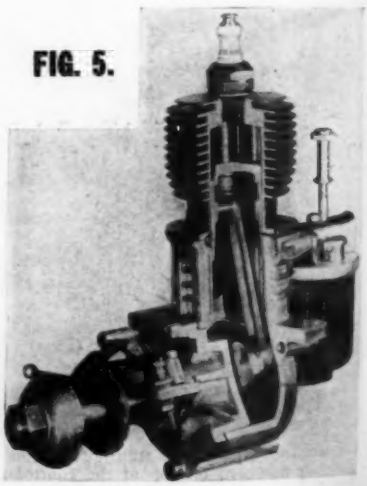


FIG. 5.



Copyright 1940 by Charles Hampson Grant

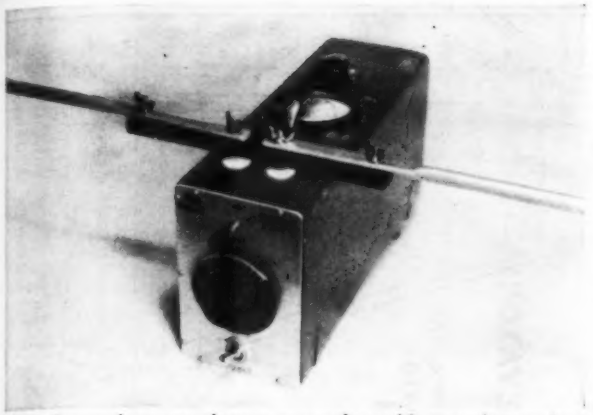


Fig. 4. Extremely compact battery-operated portable control transmitter

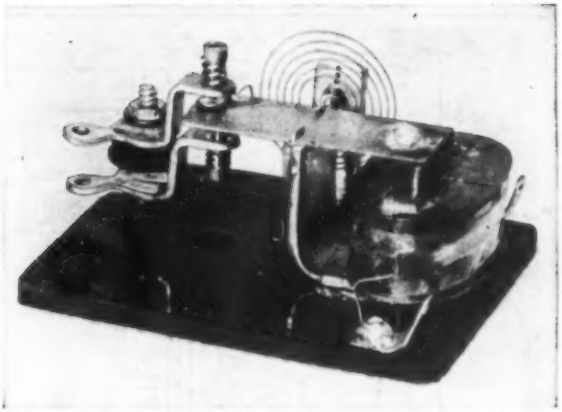


Fig. 2. A homemade sensitive relay constructed mainly of scraps

ELEMENTS OF RADIO CONTROL

PART 4

By HOWARD McENTEE

SINCE the last article of this series was written the art of model plane radio control has not changed greatly; no radically new control systems have appeared. Rather, progress has been along the lines of constant refinement, as is the case in so many fields.

One change that may be noted, and it is certainly a change for the better, is the wide variety of equipment now available to the experimenter. When the game first started, makeshifts were the usual thing and all sorts of odd parts were pressed into service in both the radio end and the control surface moving apparatus. Now a great assortment of parts and complete outfits, all engineered for the specific purpose, may be had. There are even companies specializing in the production of this sort of apparatus alone.

Utilization of this new crop of equipment will mean that not as much skill is required in re-building and adapting other equipment for control purposes. Thus, the field will not be so closely limited and should be open to many more builders, particularly since the prices have been lowered because of the larger volume of manufactured materials—and the inevitable competition that has arisen.

A case in point may be taken from

(Continued on page 58)

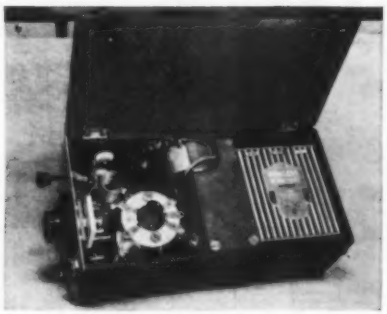


Fig. 5. The tube sockets are mounted one above the other

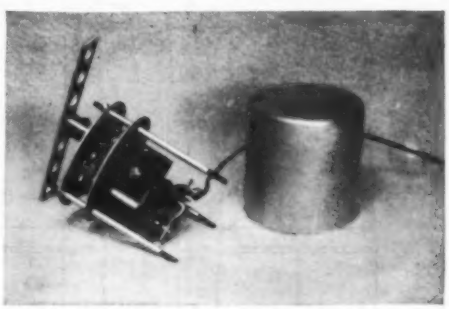


Fig. 1. A very reliable, light, commercial geared-down motor

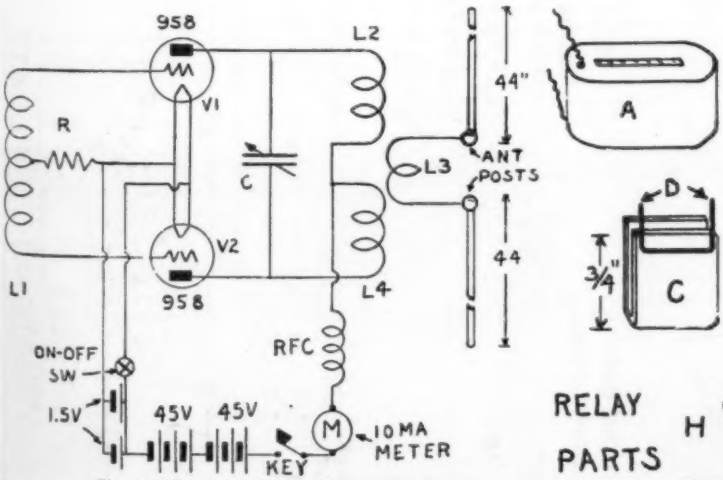


Fig. 6. Circuit of the small control unit

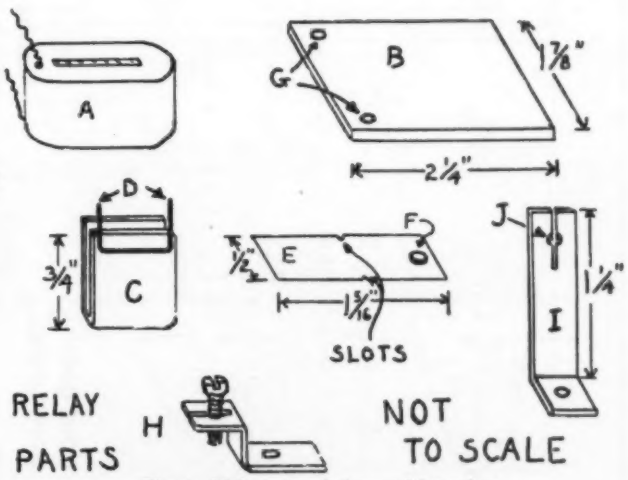
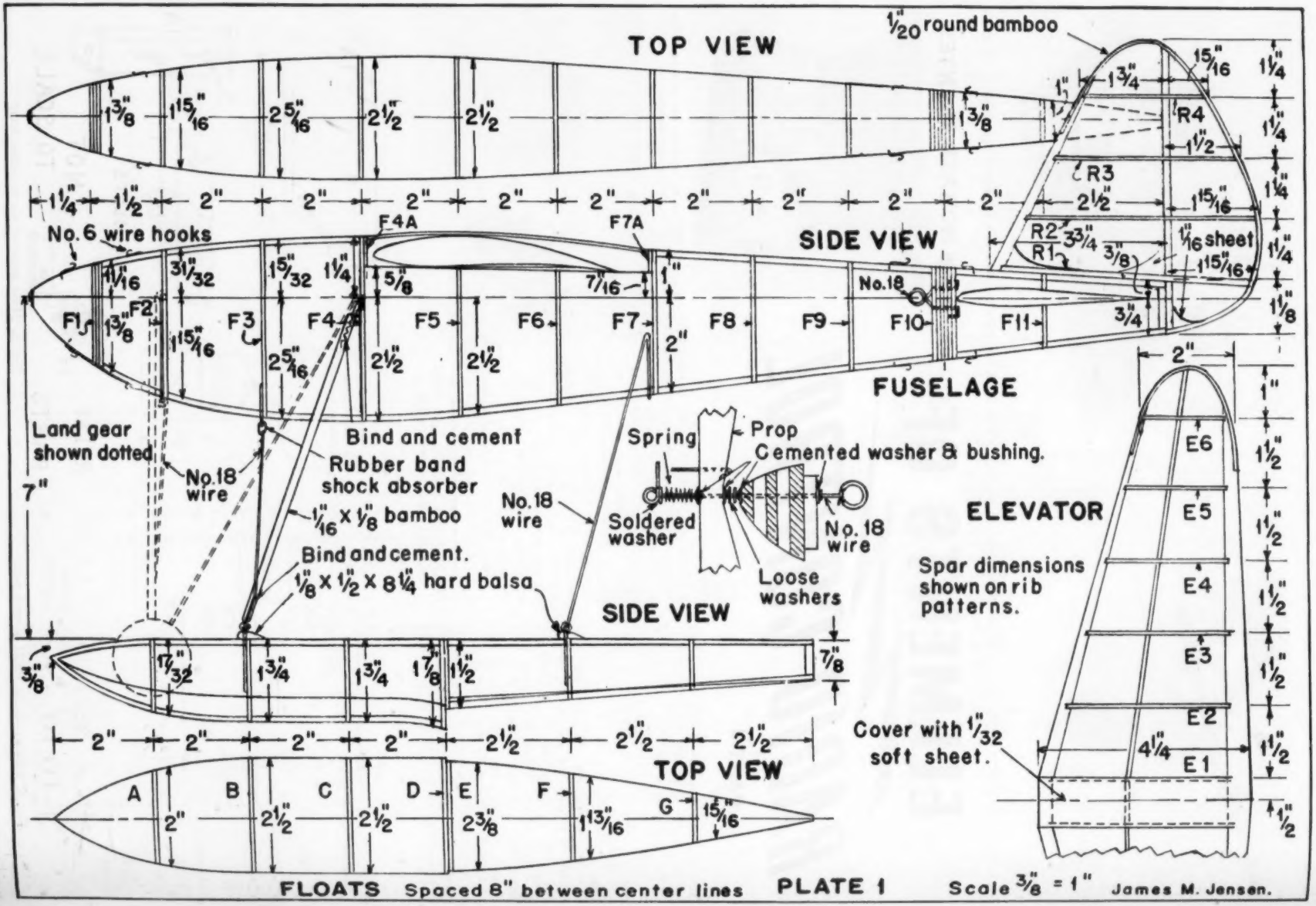
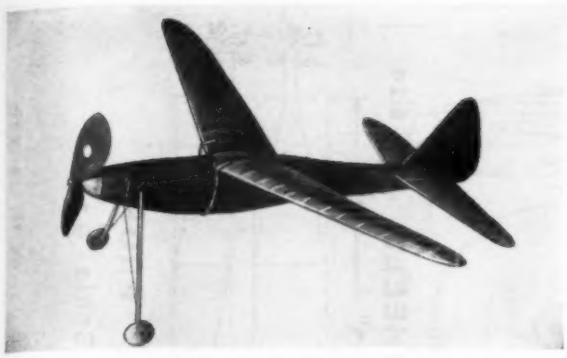
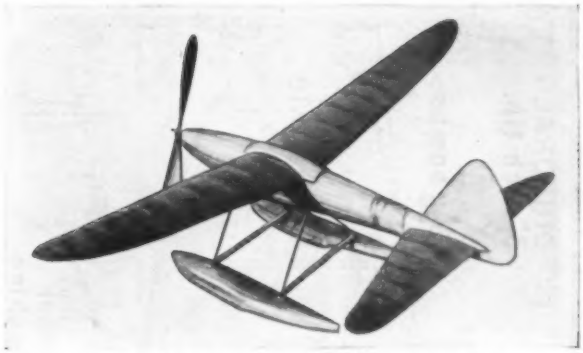


Fig. 3. Main parts of the sensitive relay


TOP VIEW
1/20 round bamboo
SIDE VIEW
No. 6 wire hooks
F4A
F7A
No.18
1/16 sheet
FUSELAGE
Land gear shown dotted
No.18 wire
Bind and cement
Rubber band shock absorber
1/16 x 1/8 bamboo
Bind and cement.
1/8 x 1/2 x 8 1/4 hard balsa
Spring
Prop
Cemented washer & bushing.
Soldered washer
No.18 wire
Loose washers
SIDE VIEW
ELEVATOR
Spar dimensions shown on rib patterns.
Cover with 1/32 soft sheet.
TOP VIEW
FLOATS Spaced 8" between center lines
PLATE 1
Scale 3/8 = 1"
James M. Jensen.



As a land plane it has won many contests



As a "hydro" it is a beautiful and consistent flier

A WINNING CONTEST SEAPLANE

A Double Purpose Model Of High Efficiency

By JAMES JENSEN

THE plans presented here are for the most successful of a series of experimental twin-float seaplane models built by the author in an attempt to conquer the difficulties encountered in this phase of model building. The same pair of floats were used throughout these tests, and it was found that most of the difficulties with this type of model were due to misfit pontoons.

The first experiments were conducted with a high-winged, light-weight model of square construction, with medium power, 180 inches of wing area and 17 inch prop. This model flew and glided very well, but could only be made to rise off the water on rare occasions. Due to the light construction it would not withstand many duckings without necessitating repairs, so was soon discarded.

The next model was built to the other extreme—sturdy construction, high powered, with 115 square inches of wing area and 12 inch prop. This model was extremely stable on the water, but in flight it appeared to have a built-in head wind. Flights were limited to short hops, and the glide was terrible.

The third model is the one shown here. This streamlined little beauty jumps off the water in about two feet, climbs steeply to 150 feet altitude and averages 60 to 65 seconds on 500 turns. It has had its share of "christenings" but when the proper method of launching was achieved it would take off successfully almost every time. As a landplane it passes contest rule requirements for Class "C" fuselages, and is no slouch in this event, having won first prizes for the author at two open contests.

Now let's start construction.

Fuselage

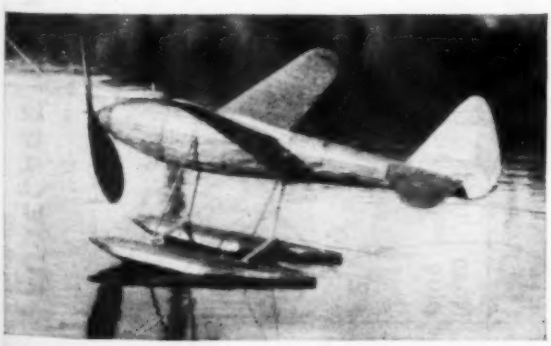
Fuselages with elliptical cross-sections are still quite rare, mostly because many modellers regard them as too difficult to construct. If the half-shell method, described below, is followed carefully, a very accurate fuselage will be the result and no difficulties should be experienced. The beauty and efficiency of the finished product is well worth the extra hour or two of time required by this type of construction.

The half-shell method consists of building the right and left halves of the fuselage

(Continued on page 65)

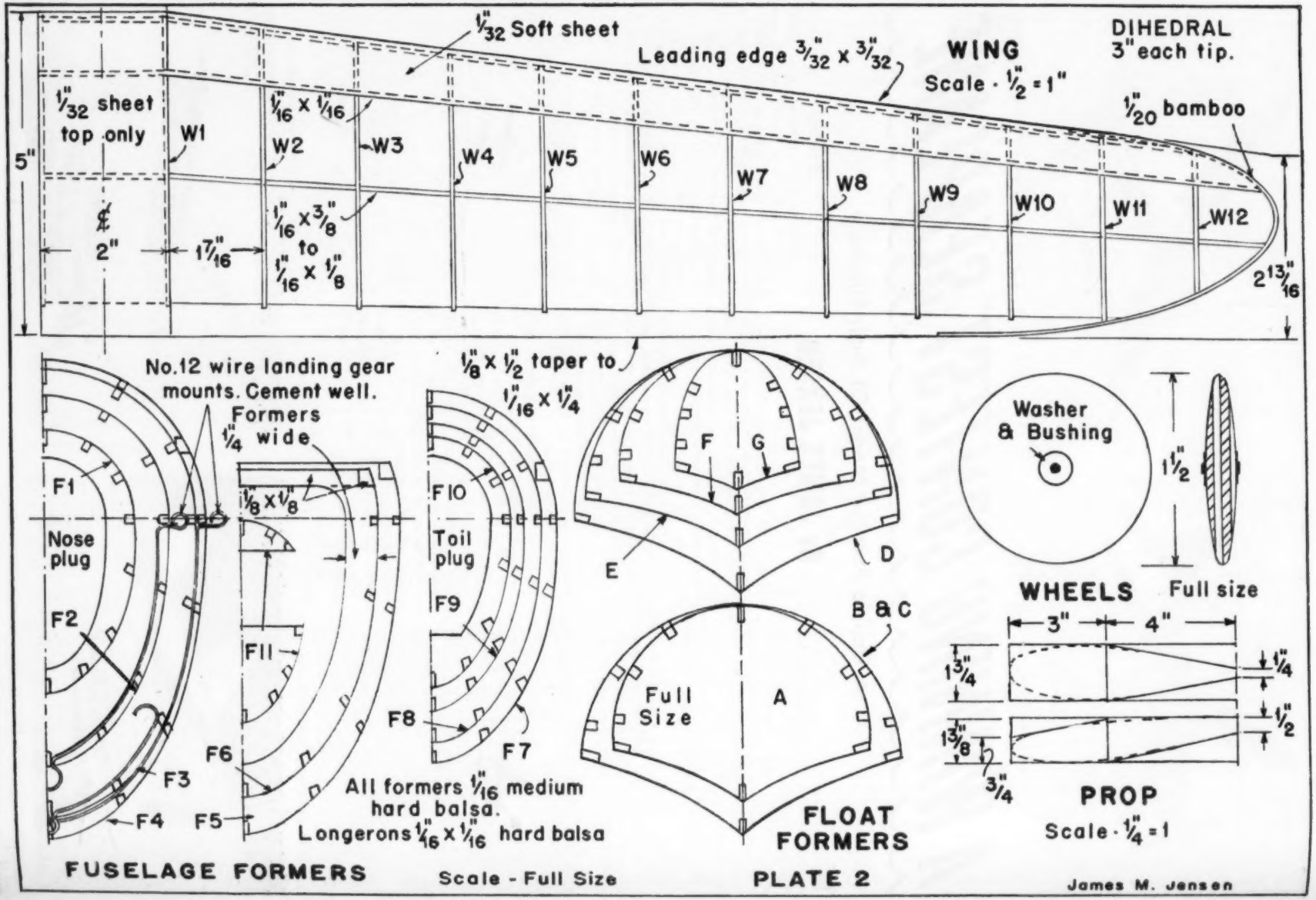
On its way after a water take off

Overhead climbing for altitude



On floats, the balance is right for easy take offs

Long tapered wings provide high flight efficiency


WING
Scale · 1/2 = 1"
1/32 Soft sheet
Leading edge 3/32 x 3/32
DIHEDRAL
3" each tip.
1/32 sheet top only
1/16 x 1/16
1/20 bamboo
5"
W1
W2
W3
W4
W5
W6
W7
W8
W9
W10
W11
W12
2"
1 7/16"
1/16 x 3/8 to 1/16 x 1/8
2 13/16"
No.12 wire landing gear mounts. Cement well.
Formers 1/4 wide
1/8 x 1/2 taper to 1/16 x 1/4
F1
Nose plug
F2
F3
F4
F5
1/8 x 1/8
F11
F6
F10
Tail plug
F9
F8
F7
All formers 1/16 medium hard balsa.
Longerons 1/16 x 1/16 hard balsa
FUSELAGE FORMERS
Scale - Full Size
F
G
E
D
B & C
Full Size
A
FLOAT FORMERS
Washer & Bushing
1 1/2"
WHEELS
Full size
3"
4"
1 3/4"
1/4"
1/2"
1 3/8"
3/4"
PROP
Scale · 1/4" = 1
PLATE 2
James M. Jensen

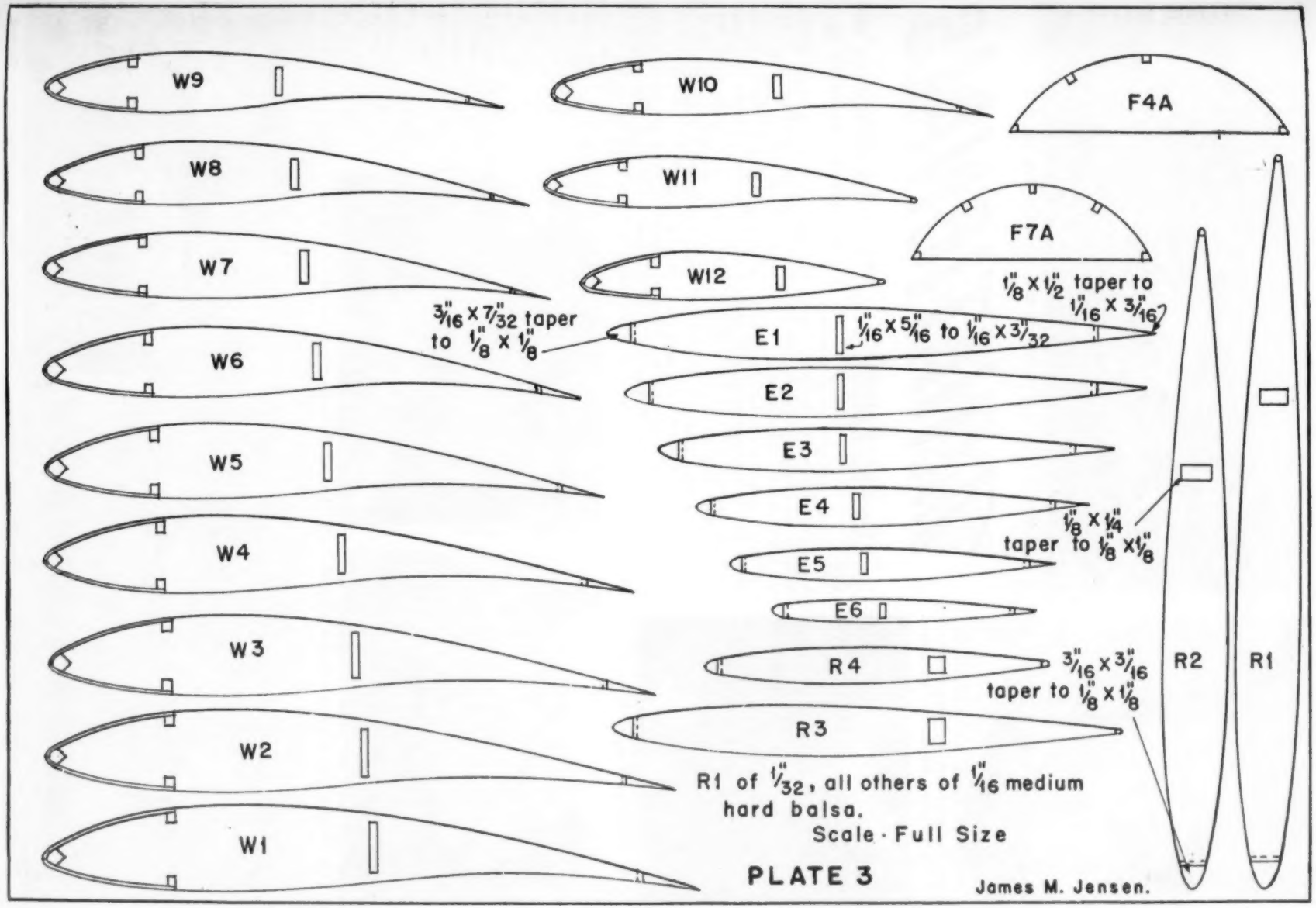


PLATE 3

James M. Jensen.

Henry Thomas, last year's Nationals winner, and his helicopter which he demonstrated

A glimpse of one part of the field with contestants preparing their models

The NATIONALS

By THE EDITOR

Thrilling Glimpses and Complete Account of

WITH the presentation to illustrious winners of an elaborate display of "hardware" at the Victory Banquet on July 6th, the 1940 Nationals was concluded.

Without exception, this was the greatest model airplane contest that has ever been held. It was sponsored by the Chicago Park District and the Chicago "Daily Times." Too much cannot be said for the show for which they were responsible. Headquarters at Chicago was the Hotel Sherman. Outdoor events were held at Park Site No. 73, 79th Street & Keller Avenue; indoor events at the 132nd Infantry Armory, Madison & Rockwell Streets. At most of the other Nationals a number of slip-ups in organization and a certain amount of confusion were present, but this was entirely lacking at this contest. This, by far, was more efficient and more completely organized than any other contest ever held.

Enough cannot be said for the thoroughness with which things were prepared and handled. The credit should not be given to any one person but to the well-organized group from the "Times" and the Park District that was in charge of the meet. Mr. Maurice Roddy of the "Times" was one of the moving factors; with a quiet, unassuming manner he made things hum and got things done. Mr. Frank Nekimken of the Park District, also contest director and state leader of the A.M.A., was the National's Contest Director. Mr. Steve

Ed Lidgard and record helicopter

Tony Kouzlowska's winning scale job takes off

Jim Cahill has his ship measured before flight

The Buzzards Club makes a mass flight of models all of one design

Contestants line up at headquarters to get "the dope"

The Buzzard Club builds models of identical design. Joe Konefes, right, won in Class C

Leon Shulman flies his Class A gas job to a new senior record of more than 22 minutes

ON PARADE

The 1940 National Model Airplane Competition

Assisted By A. G. DAVIS
Pictures By HAROLD KULICK

Meuris was Contest Manager and responsible for the financial details, which, we may say here, were tremendous. All of these gentlemen gave the appearance of being at ease and not overworked; however, this was not the case but the impression was due rather to the fact that everything was so well organized that the contest ran without a hitch. Those who make the most fuss are not always the hardest workers—and it was so in this case. To Mr. F. E. Kardas of the Park District a great deal of credit should go also. Many months before the actual meet he prepared to insure that all details would be properly handled.

Mr. Nekimken has been with the parks at Chicago over six years and has conducted all important contests for them. Therefore, with his fine record, it was logical that he took charge of activities in such an admirable manner. Chicago, in 80 of its 120 parks, yearly instructs 1,000 young men and women in model airplane building and flying.

America's largest academy - affiliated chapter, The "Times" Air Cadets, with 40,000 members, is headed by Mr. Maurice Roddy, aviation editor of the Chicago "Times." Mr Roddy was in charge of publicity and the Victory Banquet. The "Times" sponsors regular monthly contests and at each one many valuable awards are given.

With these two organizations sponsoring the contest, and these men of experience in

R. Jagiello and his Jr. record ship

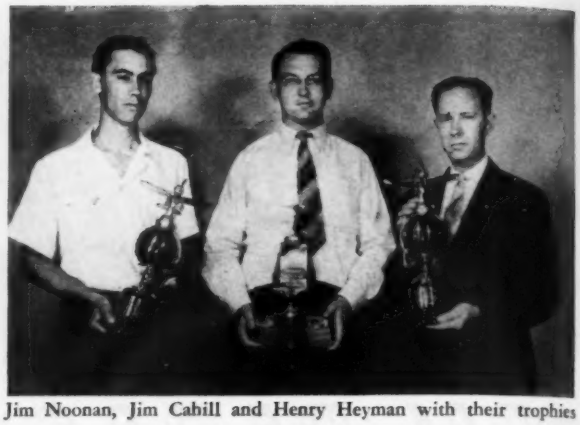
Lorain Gas Club members put their models in shape

Two C. G.s (C. Goldberg, C. Grant) and Erv Leshner

A view of part of the banquet hall and the "hardware" display

Walter and Bill Good and their winning "radio" plane

Walter March, Robert Lieber and Roman Jagiello, 1st place winners



Jim Noonan, Jim Cahill and Henry Heyman with their trophies

charge of its affairs, one could hardly expect anything but a meet *par excellence.*

Contestants arrived at meet headquarters in every sort of a conveyance—from bicycles to 16-cylinder Cadillacs. They started streaming in on Monday morning; a few arrived on Saturday and Sunday. Those who arrived late found difficulty in securing sleeping quarters, even though six and seven were put in a room. By Monday night about 1,400 contestants had assembled and were staging a near-riot in front of the registration desk on the hotel's mezzanine floor. Here Al Lewis and Bruno Marchi, with assistance, held the crowd "at bay" by passing out blanks to be filled in. Contestants from all over the country, actually from forty-two states and Canada, registered.

One of the important features of the contest was the exhibit on the mezzanine floor of the hotel, which was managed by Mr. John J. Russo of the "Times." It was put on by manufacturers and publishers; about seventy were represented, and booths filled the entire available space. Every kind of merchandise dear to the hearts of model builders was displayed; including all kinds of motors, planes, material and gadgets, as well as the latest copies of model magazines. MODEL AIRPLANE NEWS had an outstanding exhibit over which Mr. and Mrs. Erle Baker, M.A.N.'s Chicago representatives, presided.

First activity was the contestants' meeting in the Ballroom at 7:30 P.M. Here meet officials prompted assembled contestants in respect to the rules and how the contest would be run. This was to clear up any questions and to give out information necessary to insure that the events would run smoothly.

Laurence Maze won Class B Jr. gas event

Mr. Kapp, Comet Trophy, and Rancel Hill

Walt and Bill Good win Roberts Trophy

Do Adam presents Gar Wood Trophy to Bill Engelhardt

John Droschkoff, Leon Shulman and Pinky Fruchtman—winners

H. Mollenhauer gets Chicago Jr. Ch. of Com. Trophy

The Detroit group, led by Steve Corbett, won the Megow Trophy

On Tuesday, the 2nd, bright and early, the contestants went to the outdoor site for the Flying Scale and Moffett Cabin R.O.G. Eliminations Events.

The manner in which the field was laid out was a typical example of the fine organization of the meet. As you turned off the road into the field, there was a parking space for spectators. Passing through this you approached a gate where a uniformed guard presided, and no amount of persuasion could get you past this fellow with an automobile unless you could show official credentials. Beyond him was a parking space for official cars and 200 feet further on a rope fence divided this area from "no man's land." In front of this rope were the concessions where spectators and contestants could buy drinks, sandwiches and supplies for their model ships. Beyond the rope were tents housing the official meet headquarters and headquarters for the A.M.A.

A loud speaker system was close by through which necessary announcements, such as news of found ships and calls for various contestants, were made from time to time. It was approximately 400 feet across "no man's land" to the flying field. Here group headquarters were lined up from one end of the field to the other, extending at least a quarter-mile. Each group was supplied with two or three tables at which models were measured and weighed by special instruments prepared by Raoul J. Hoffman, the contest technician. Here also official flight records were first recorded, before being sent back to the main headquarters tent.

Beyond the group tables was an unbroken expanse of field. 200 feet from each group tabl were runways, pointing to windward. The field was excellent; not only in respect

Mr. and Mrs. Snyder, Modelcraft Trophy, B. Gibson

Miss Dot. Travis presents Bloomingdale Trophy to Geo. Cain

Jim Bashor, youngest contestant who won a first place

Mr. and Mrs. Ohlsson present their trophy to Bill Redeke

Three more winners: Bill Schwab, H. Kaczynski and Erv Lashner

Milton Huguelet makes microfilm for his indoor stick model

Joe Mastrovich bargains for props sold on the flying field

to its great expanse, but it possessed one feature of which few other fields can boast: About 100 feet beyond the runways a broad expanse of four foot marsh grass spread out in all directions. Many wayward models that refused to cooperate with the anxious builders were saved from total destruction when they dove into this soft "blanket" provided by nature (and the meet officials).

150 full-time park employees were especially trained at the Chicago Park District Model Airplane Institute, to act as timers and processers for this meet. Runways had to be cut specially from the high grass. Two complete sound systems roved the field to announce results and co-ordinate field operations.

Tuesday the weather was very fine—bright and sunshiny—and the slight breeze which was blowing didn't hinder flights. During the day the contestants vied with one another, keeping the sky literally filled with models. Unfortunately, however, flight results in the Flying Scale Contest had to be cancelled as a number of ships were mistakenly hand launched instead of R.O.G.ed.

In the Flying Scale Event Mr. Victor R. Fritz, of the Academy Flying Board, was chief judge. He was aided by Mr. Harry Vogler, Jr. There was an extremely large number of entrants who had some beautiful models. Fifty points were allowed for duration of flight and fifty for general workmanship and fidelity to scale. The winners in the three events were:

Joe Konefes, winner Class C Event, receives MODEL AIRPLANE NEWS Trophy from Jay Cleveland and Chas. Grant

Homer Heller won the John Russo and Mulvihill Trophies

George Sass, National Champion, Exchange Club Trophy, N. R. Thurston

W. Simmers, Berkeley Trophy, B. Effinger

Louis Vargo gets Ill. Private Pilots Trophy

Vic Bobacheff, Jim Noonan and "scales"

Junior, Al DeBuschere of Detroit; Senior, R. D. Hill of Akron; Open, Ed Naudzuis of Detroit.

The Moffett Eliminations were won in the Junior, Senior and Open Classes, respectively, by: Hilton Mollenhauer of San Antonio, Texas; Caldwell C. Johnson of Hampton, Va.; and Robert Reich of Cleveland, Ohio. The Final Event was won by R. Nelder of Canada.

Wednesday, July 3rd, was devoted to indoor flights at the 132nd Inf. Armory. One regular event, Indoor Stick, was run. However, Ed Lidgard took it upon himself to give a special exhibition of his ornithopter, which proceeded to stay up for approximately 2½ minutes, to officially break the world's record for this type of ship. Of course, the flight created quite a stir.

One of the most remarkable flights of the day was made by R. Jagiello of Chicago, who kept his model in the air for 19.3 minutes, to establish a new Junior record. The Senior Event was won by Milton Huguelet of Chicago with a time of about 18.4 minutes. W. March of Chicago won the Open Event with a time of 17.6 minutes.

July 4th was an exciting day. Class A, Class C Gas, Radio Control and Berryloid Events were held at the outdoor flying field. An enormous crowd assembled to watch the "stunts" that the hundreds of gas jobs proceeded to perform. It was literally a "flying circus," including every thrill that it is possible to attain with these little ships. There were so many ships in the air that they looked like a swarm of bees and sounded like them, with their tiny motors roaring at a great rate. Loops, rolls, spins and other maneuvers were executed in rapid succession. There was the usual number of crashes—the crowd thrilling at the expense of the model builders when a number of ships tore down in a straight power dive and disintegrated upon contact with the ground.

One of the unusual features in the Class C Event was the performance staged by the Buzzard Club of Chicago. Every member of this club built the same design of gas model, a picture of which is shown here. Then one of their number, J. Konefes, sent up his plane for a flight of more than 49 minutes.

Apparently this proves all the aerodynamic theories propounded by many worthy model engineers; namely, that models should be streamlined and highly efficient aerodynamically. On the other hand, it verifies facts set down by other model engineers—better flights result from an unusually stable model and greater efficiency is derived because of this stability, even in cases where great care is not used to streamline every part. Konefes' ship was a "box" type, square fuselage, square wings and very similar to the old KG. The average flight efficiency was high inasmuch as its flight was steady and the angle of attack of the wings was constant at the most efficient degree. Luckily there was a little breeze, and though it climbed to a high altitude it remained within sight of the field.

There has been much speculation as to the relative merits of Class A and Class C

NOT TO FAR NOW
BACK HOME THIS DID 2 MIN. ON 10 SEC. MOTER RUN AND IT WAS JUST TICKING OVER
THE CHART SAYS 55 FT.
SHOULD HAVE CHANGED TO SUMMER OIL
MAYBE PINS WILL HOLD IT
NOW THIS BUTTON WILL—!
WELL NEXT TIME I WILL BUILD BEFORE THE CONTEST
—TIMER
NO MANS LAND
I'LL HELP YOU
FLYING FIELD
MAYBE A SPRING OR RUBBER BAND JR
MODEL AIRPLANE FLYING IS A BOYS SPORT
BUT I TELL YOU SHE IS MY HELPER
A FEW CUTS
MY FIRST MODEL
THERE MUST BE A RAISER OVER THIS TABLE—IT WEIGHED ENOUGH LAST TIME.
—AND THEN UP! UP!
John Kubiks

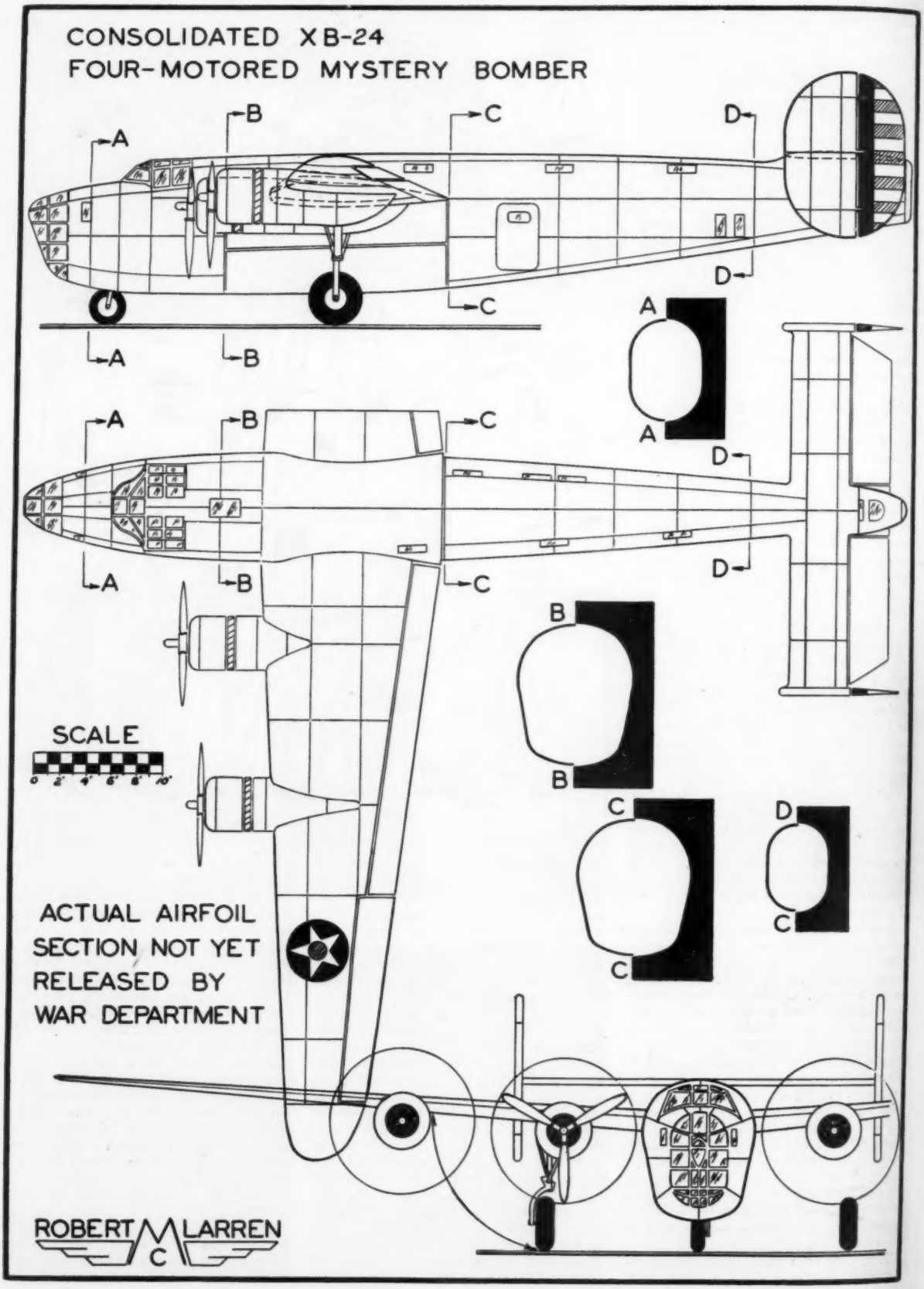
gas models. Now this question is evidently settled, for W. Gibson of Middleton, Ohio, sent his model up for a flight of 47½ minutes in the Open Event. Leon Shulman of Newark, N.J., in the Senior Class, had a flight of about 20 minutes. R. Lieber of Philadelphia won the Junior Event. The other times are contained in the Results Table at the end of this article.

The Radio Control Gas Models inspired the greatest interest and beautiful flights were made. The Good Brothers turned in their usual remarkable performance with the same ship they have been using the past two years. It was under perfect control at all times. At the demand of the judge the model was made to circle in both directions, do figure 8's and return to the starting point to make a 3-point landing. It is going to be difficult for the judges to find new and intricate stunts that these ships cannot perform. The performance of Walt and Bill's plane was more remarkable in light of the fact that someone had stolen their transmitter the night before and they had worked all night at the Newark Electric Co. Laboratory to complete another one that would operate successfully.

C. H. Siegfried, with an enormous fifteen foot plane, put up another remarkable show. His plane flew all over the field, responding beautifully to the controls; however not to the degree as that of the Good Brothers' plane. Other entrants were: Joe Raspante, James Custin, Ben Shereshaw, John Ault, Phillip Sonheim, Elmer Wasman, Lester Helle, Jesse Bieberman, Robert Reder. This was the largest radio control builders' group ever to compete in a national contest. Great things were expected of Ben Shereshaw's low-wing; however unfortunately it crashed, demolishing the ship entirely. Using Goldberg's new "Sailplane," Bob Reder of Chicago prepared a radio control job in two weeks, a new record in experimentation and preparation, proving "it can be done" in getting ready if you really want to.

Jesse Bieberman, W3KT of Philadelphia, last year's 8th place winner, met with misfortune when his model failed to respond to

(Continued on page 40)


CONSOLIDATED XB-24
FOUR-MOTORED MYSTERY BOMBER
A
B
C
D
SCALE
ACTUAL AIRFOIL SECTION NOT YET RELEASED BY WAR DEPARTMENT
ROBERT MCLARREN

The Greatest Bomber In the World

THE PLANE ON THE COVER

By ROBERT McLARREN

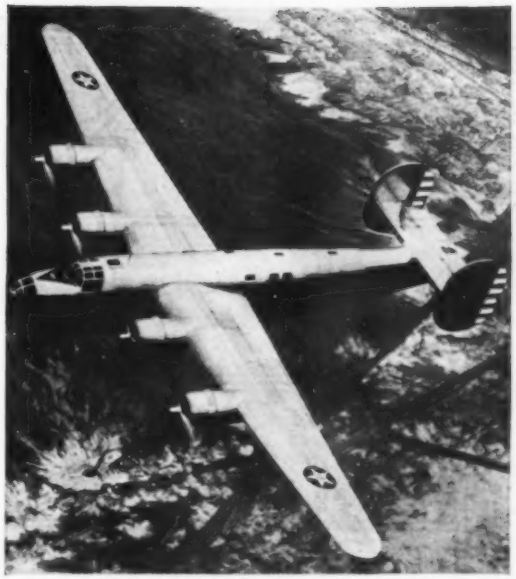
SOME time ago we gave you all the data then available on a remarkable new airfoil: the Davis Wing (MODEL AIRPLANE NEWS, September, 1939). In the intervening months two things have happened to this great airfoil: a great deal more data has come to light and it has been used on the most advanced heavy bomber design now flying. For those of us who have been interested in finding out WHAT the Davis Wing is, here is the formula as given in David R. Davis' patent number 1,942,688: to find the "X" or vertical ordinates of the upper or "suction" surface of the airfoil, $X_s = \sin\theta\,[0.6366198(A-B)+B]+\tan\theta[1-(0.6366198)(\theta)I\,(1-A)\,]$

For the "Y" or horizontal ordinates of the upper surface, $Y_s = \cos\,[0.6366198\,(A-B)+B\,] - A\,[1-(0.6366198)\,(\theta)\,]$

To find the "X" ordinate of the lower or "pressure" surface, $X_P = \sin\,[0.6366198\,(A-B)+B]+\tan\theta\,[(1-(0.6366198)\,(\theta)I(1-A)]$

To find the "Y" ordinate of the lower surface, $Y_P = \cos\,\theta\,[0.6366198(A-B)-B]-(A-2B)\,[1-(0.6366198)\,(\theta)\,]$

(Continued on page 63)



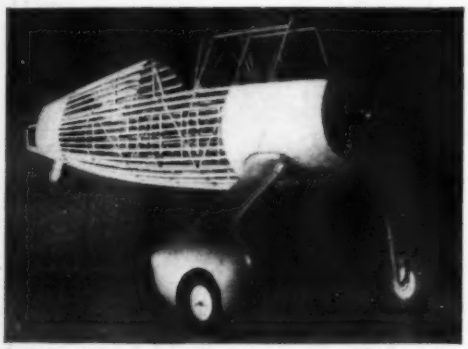
The Consolidated XB-24 bomber which has a speed of 350 m.p.h. and weighs 40000 lbs.

Simple Plastics for Models

By L. A. WILLIAMS

FOR the past twenty years considerable progress has been made in the art of building and flying of model aircraft. You need only to consider the change from pine to balsa and the introduction of miniature gasoline motors to realize this fact.

It is the purpose of this article to offer an effective method to aid modellers, which might be considered as another step in the right direction towards simplifying and advancing this hobby.



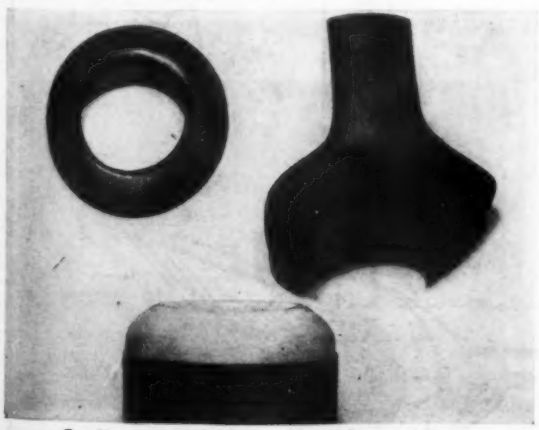
A plastic streamline landing gear makes this Lysander fuselage realistic

Many of you, particularly flying-scale model builders must have experienced, at one time or another, the difficulty in reproducing parts; such as cowlings, wheel pants, floats and other such items. The general practice has been to buy cowlings already spun, make wheel pants from a balsa wood unit hollowed out, papier-mache or even layer upon layer of bamboo paper and dope. However, these methods have proved satisfactory to a point of appearance only.

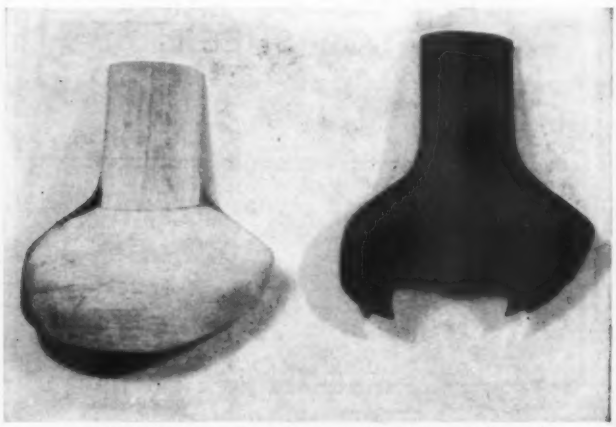
An example of this is a six foot flying scale model of the Westland Lysander. (See photo MODEL AIRPLANE NEWS, February, 1939.) The wheel fairings were left off due to their difficulty of attachment when made of balsa and not being practical for flying purposes. Consequently to you who really care for detail, the second attempt of the same plane on a smaller scale (50" span, see photo) will illustrate this fact. The wheel fairings are made up, as outlined in this article, from plastic.

This plastic is of the simplest type, which makes it available to every modeller. The main substance of its content is celluloid (which can be secured in various forms

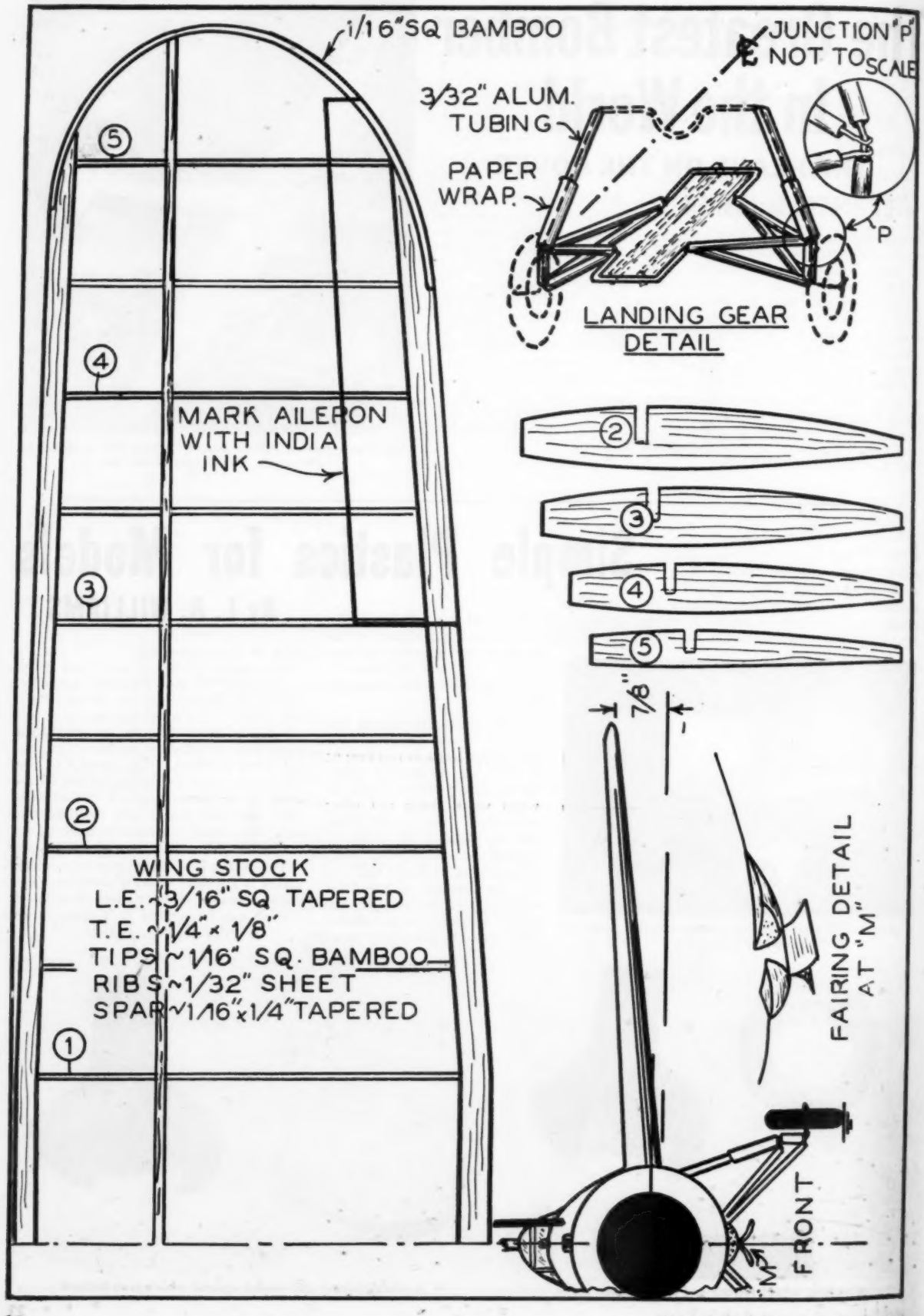
(Continued on page 62)



Cowling, wheel fairing and cowl former below



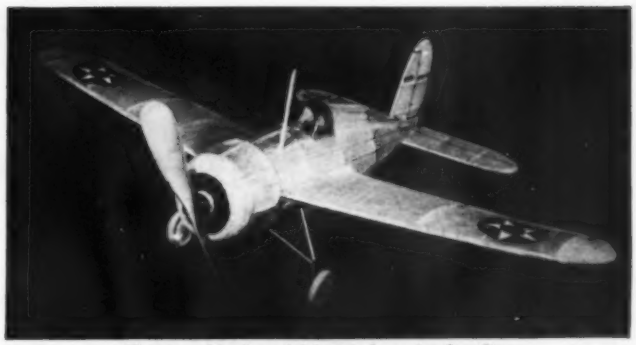
A wheel fairing and model around which it is formed


1/16"SQ BAMBOO
JUNCTION "P"
NOT TO SCALE
3/32" ALUM. TUBING
PAPER WRAP.
P
LANDING GEAR DETAIL
MARK AILERON WITH INDIA INK
WING STOCK
L.E. ~3/16" SQ TAPERED
T.E. ~1/4" x 1/8"
TIPS ~1/16" SQ. BAMBOO
RIBS ~1/32" SHEET
SPAR ~1/16" x 1/4" TAPERED
7/8"
FAIRING DETAIL AT "M"
FRONT
M

THE GRUMMAN MONO-PURSUIT

Build This Flying Replica of A Modern Navy Fighter

By HERBERT K. WEISS

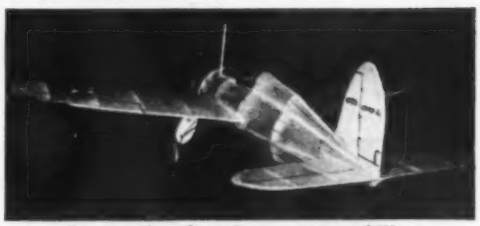


The completed model is sturdy and a fine flier

"WELL-FED" is the word for Leroy R. Grumman's series of chunky F4F navy fighters. First of the line of Twin Wasp powered, mid-wing flying-powerhouses to reach the public eye was the XF4F-2, for which plans are here presented. Since the XF4F-2 was put through its paces the design has been carried still farther with the object of improving the stability and performance.

Out of the spin tunnel, in which dynamic models are spun to determine the effects of design changes on recovery characteristics, came the discovery that rectangular wing tips and a squared rudder allowed the XF4F-2 to pull out of a spin in fewer turns. Careful wind tunnel tests indicated the desirability of a huge spinner over the prop hub to complete the fuselage lines. And so, in the process of development the F4F lost its graceful tip shapes and acquired a "nosey" aspect, so that as the G-36 for export and the F4F-3 in production for the U.S. Navy, the ship resembles less a graceful winged tear-drop than a vicious flying bullet.

With a 1050 hp. Pratt & Whitney Twin Wasp, the export model is rated at 330 m.p.h. top speed, 295 m.p.h. cruising and possesses a normal flight range of 1100 miles.



Large tail surfaces insure great stability

Worthy of note are the sharp narrowing of the fuselage fairing behind the pilot, to improve vision to the rear on each side; the neat row of belly windows which eliminate the blind spot which has been a dangerous disadvantage of many mid-winged fighters, and the fully-retracting landing gear.

Our model is of the earlier XF4F-2; the experimental ship with its round wing tips and rudder. Simply built to attain lightness for good performance, this model Grumman has turned in many long stable flights of average half-minute duration. Modellers desiring to reproduce the latest square-tipped model may easily perform the conversion with the aid of photographs of the latest design.

In full flight it is most realistic

Wing

Construction is begun with the wing, which is assembled in one piece for strength. Sufficient ribs are shown on the drawing for a scale model. The ribs which are not numbered are made by cutting out two of the next largest and cutting one down slightly to fit. A flying model can dispense with these alternate ribs for lightness.

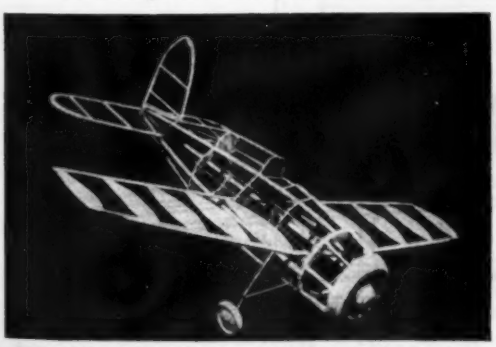
To obtain a drawing of the left half of the wing, place a sheet of white paper under the plan with a sheet of carbon paper under both, face up. Then trace the drawing, the carbon duplicate will be reversed; that is, opposite to the right half, and may be attached to the right wing panel layout at the center line to give the complete wing layout. Put waxed paper over the plan and assemble the wing frame on it. Cut the leading and trailing edges to airfoil section after assembly. Bend the wing tips from 1/16" square bamboo by holding close to a lighted cigarette. Bamboo tips are preferable to balsa ones on a flying scale model because they absorb landing shocks better. Crack the spars just outside Rib 1 and recement them to give the wing the proper amount of dihedral.

Fuselage

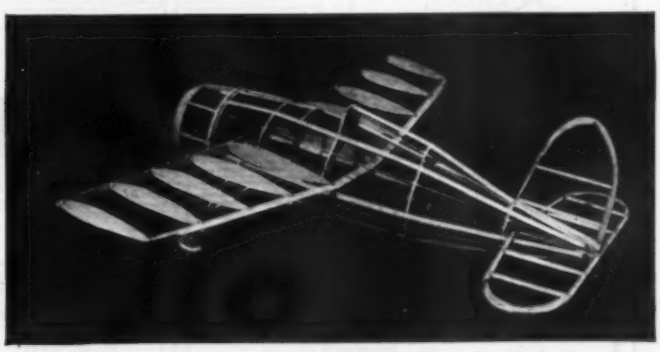
Cut out two halves of each bulkhead and cement the halves together. Bulkheads D, E, F, Fa, G, H, and J are 1/16" sheet balsa, and A, B, C, a, and b are 1/8" sheet balsa, Cement bulkheads F and G to the wing center section as shown and attach the two main 1/8 x 1/16" side stringers.

Add the top and bottom stringers and the two which run along at the cockpit edges. These are also 1/8" x 1/16" balsa. The remaining stringers are 1/32" square bamboo. If the builder wishes primarily a non-flying scale model, these may be replaced by 1/16" square balsa. However, the writer has found that in a flying scale model, the use of bamboo stringers gives the fuselage a

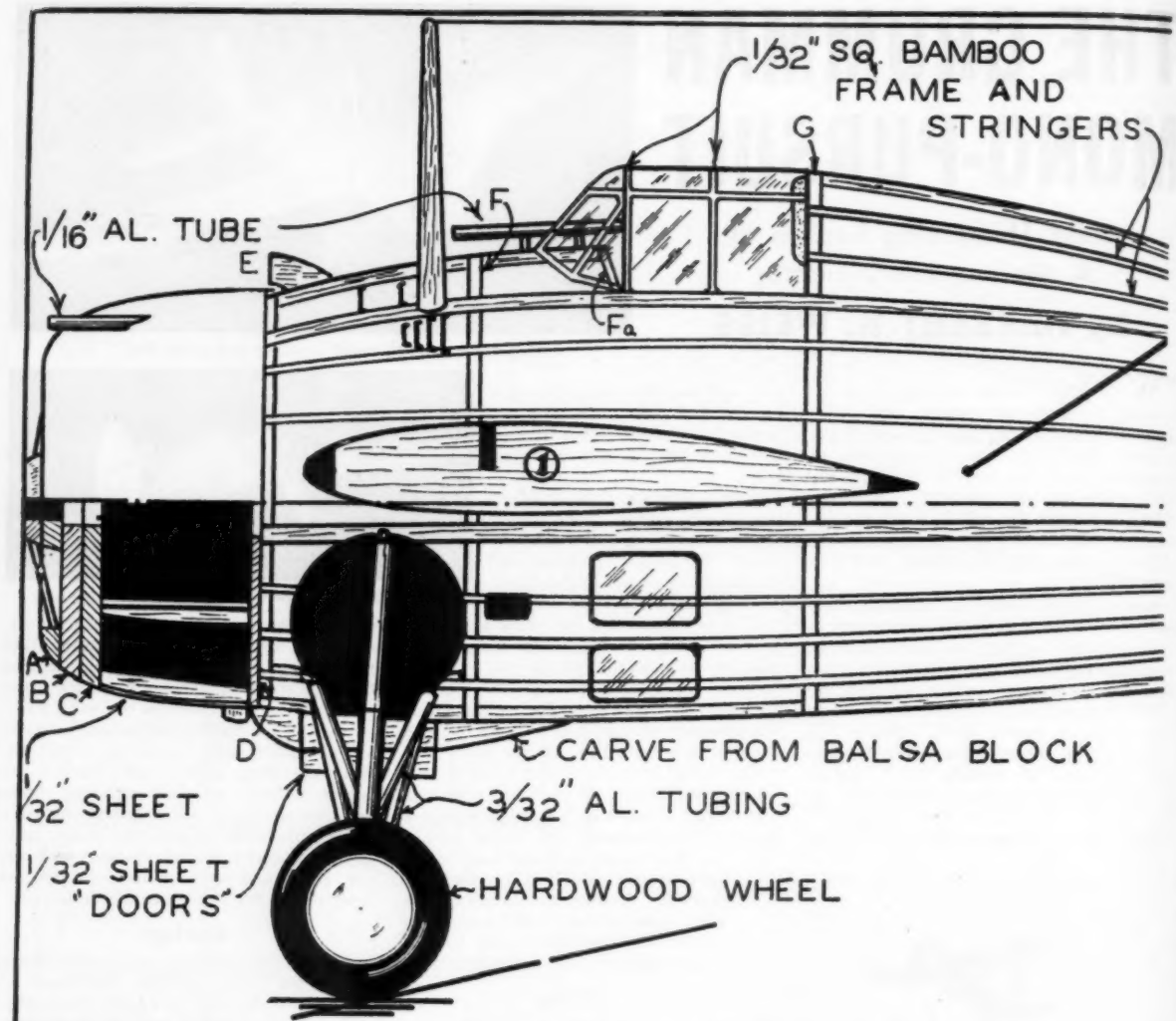
(Continued on page 57)



The completed frame is realistic in detail

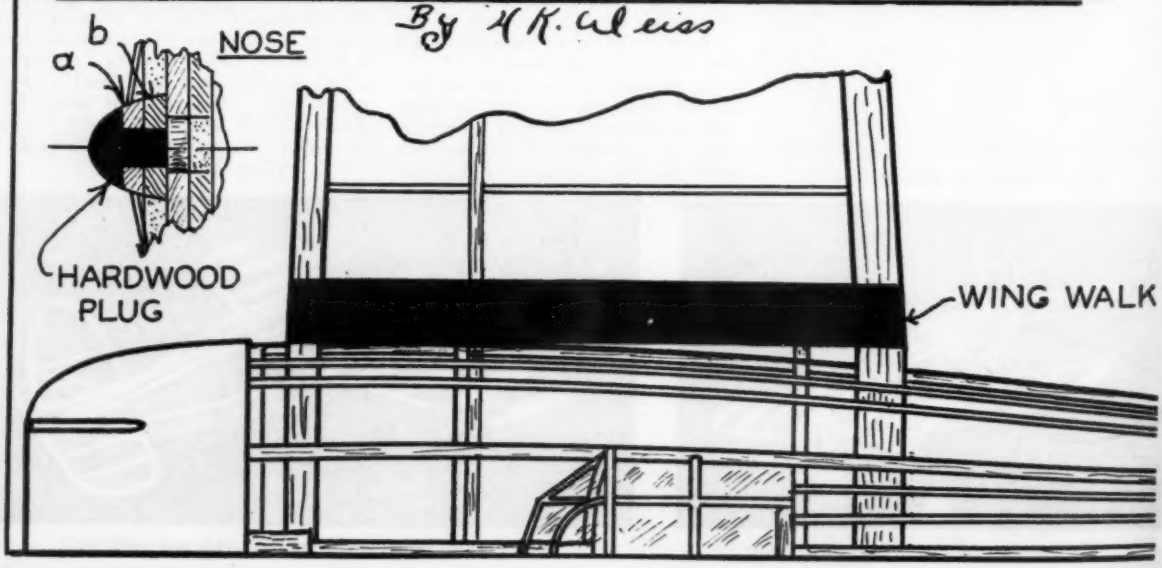


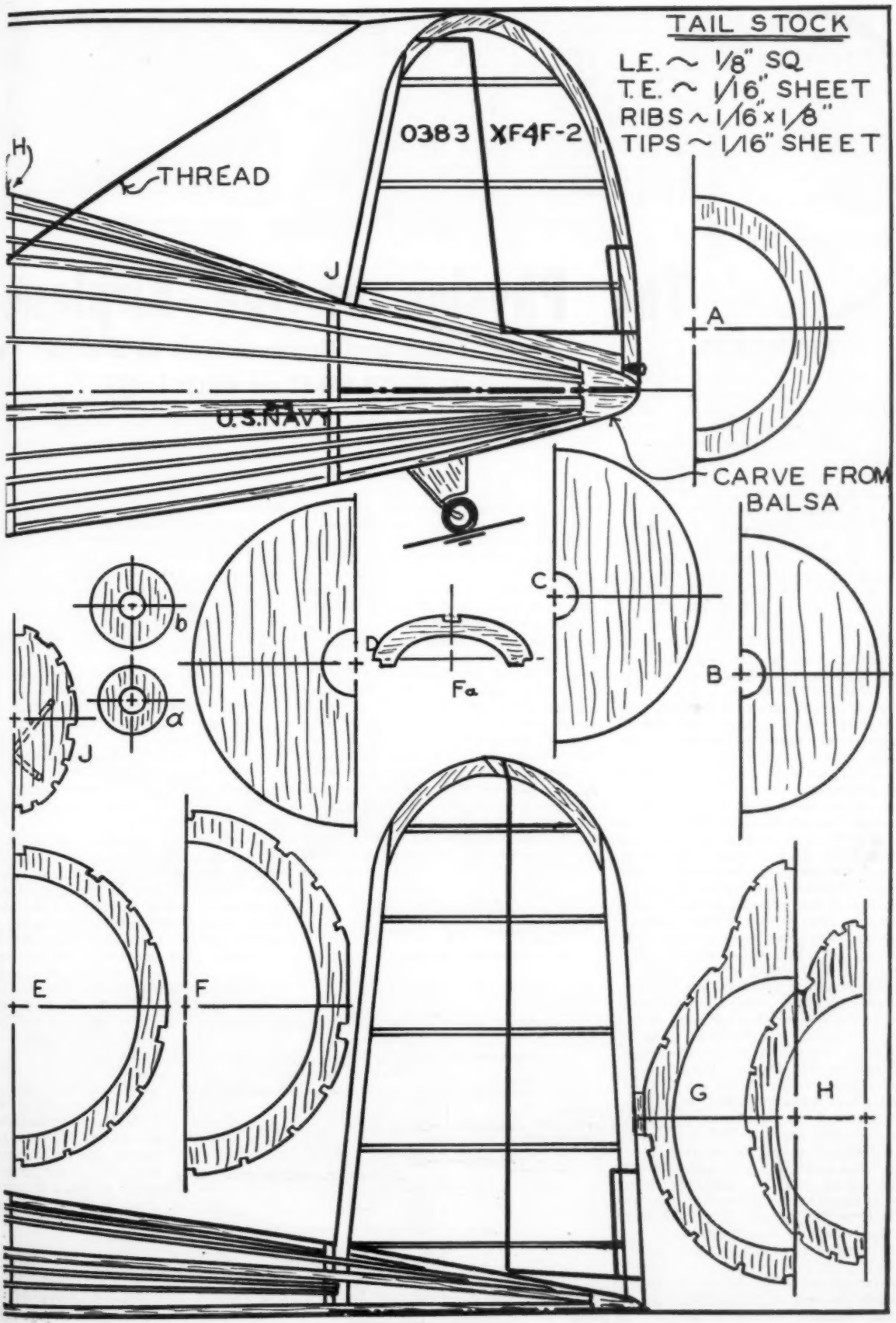
The structure is simple and can be quickly and easily built



GRUMMAN XF4F-2

By H K. Weiss




TAIL STOCK
L.E. ~ 1/8" SQ.
T.E. ~ 1/16" SHEET
RIBS ~ 1/16 x 1/8"
TIPS ~ 1/16" SHEET
0383 XF4F-2
H
THREAD
J
U.S.NAVY
A
CARVE FROM BALSA
C
B
D
Fa
b
a
J
E
F
G
H

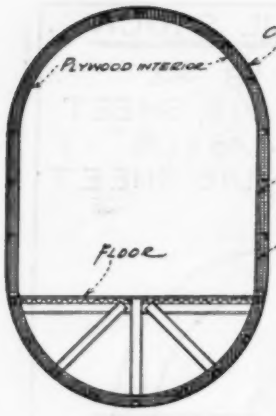
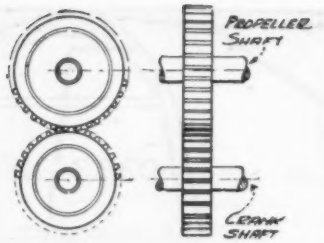

OUTER SHELL
PLYWOOD INTERIOR
KAPOK INSULATION APPLIED TO OUTER SHELL WITH CEMENT AND FILLS ENTIRE DEPTH OF BULKHEAD
FLOOR

Fig. 3. Typical cross section of shell fuselage showing layer of soundproofing insulation against heat and cold



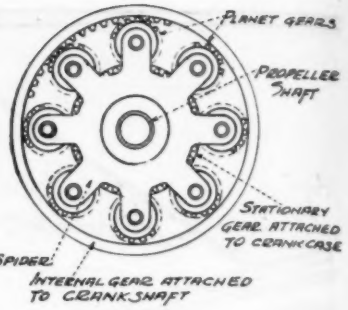


Fig. 2. A spur and planetary gear system in elementary composition

The Physics of the Airplane

ARTICLE 16

Production and Suppression of Sound

By Lt. JAMES EAMES and WILLIS L. NYE

AERONAUTICAL engineers are deeply interested in the phenomena of sound. It would be an asset from a military viewpoint to build aircraft which were completely noiseless, or in a practical sense, as noiseless as possible. The value of the attack airplane, for instance, would be enormously enhanced as would be the bombardment airplane, not to mention the added comfort which would be directly applicable to civilian air transportation. While sound and acoustic experts have lowered the sound level of a modern airliner to a lower decibel rating than a conventional Pullman coach, nevertheless, sound is still too annoying to consider the problem as being solved. Therefore, we as students must be interested mainly in the suppression of sound and what methods are applied to reduce sound. Aside from the inconvenience of hearing, psychological tests have proved that mental fatigue ensues during a continued exposure to sound of high intensity, as well. The effect on the physiological system is also detrimental.

Sound may be defined as any form of vibratory motion in an elastic material which affects the auditory nerves of the human body. In this manner, the sensation of "hearing" is experienced or produced. The sources of sound are invariably bodies that are in a state of vibration. In fact, a very definite relation exists between sound and vibratory movement. Thus, a body that is vibrating violently will emit strong sound waves. As the amplitudes of the vibrations decrease, the strength of the sound is diminished in proportion and, finally, when the vibratory movement is completely arrested, we find that the sound ceases altogether.

Sound travels forward from the original source of disturbance, where it has originated, in the form of a wave motion. Sound waves are classified as compressional waves; that is, as they move forward they compress the surrounding air particles. The characteristics of sound waves are similar in all respects to the general forms of wave motion which we have made a concise study of in our last article.

Although we might be occasionally inclined to believe that sound becomes audible to an observer simultaneously with the occurrence of the disturbance producing it, we can readily disprove this fallacy by means of our own simple experience. Who of us have not seen the steam rising from the whistle of a distant steamship a considerable fraction of the time before the actual blast is heard? Or how many times have we stood on the tarmac of an airport and observed the discharge of black smoke from the engine exhaust of a landing airplane before we could distinctly hear the resulting burst of power?

The velocity of sound was first measured with painstaking accuracy after many elaborate experiments by a French scientific commission in 1882. The commission found that the speed of sound varies with the temperature of the medium in which it travels. The original value, which has since been verified by subsequent observers, concedes that sound has a velocity of 1090.5 feet per second at 0 degrees centrigrade. At higher temperatures sound travels faster. In fact, the increase in the speed of sound approximates two feet per degree centigrade.

EXAMPLE: The exhaust smoke resulting from the pilot's "gunning" of an airplane engine upon landing becomes visible 2 seconds before the report is heard. The temperature of the atmospheric air is 20 degrees Centigrade (68 degrees Fahrenheit). How far away is the airplane from the observer? Applying the correction factor of 2 feet increase in the speed of sound for each degree rise in temperature in the centigrade scale:

$2 \times 20 = 40$ feet per second increase.

The speed of sound at 0 degrees C. is 1090.5 feet per second.

The speed of sound in the involved problem is:

1090.5 plus 40 or 1130.5 feet per second.

Since two seconds have elapsed between the sighting of the exhaust smoke and the actual hearing of the engine bursts,

2×1130.5 is 2261 feet and represents the distance from the observer to the airplane at the immediate time.

The sensation of sound is characterized by three important factors:

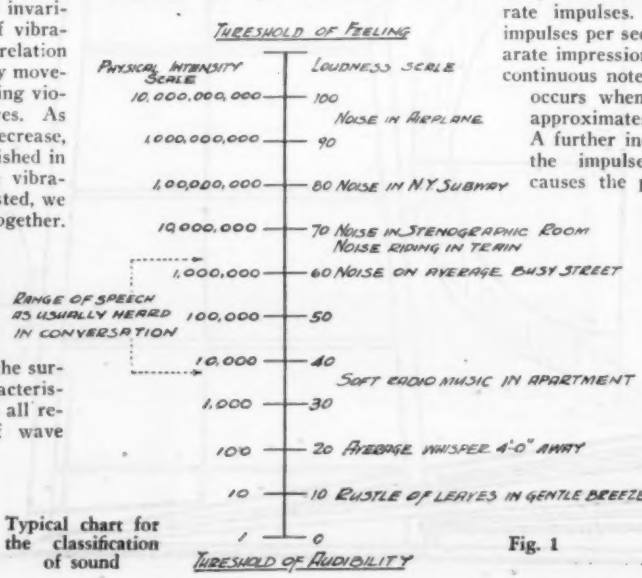
(1) Pitch. (2) Loudness. (3) Quality.

When a sound recurs at regular intervals, it becomes heard as a series of separate impulses. Should the number of impulses per second be increased, the separate impressions tend to disappear and a continuous note is heard. This condition occurs when the number of impulses approximates a value of 30 per second. A further increase in the frequency of the impulses beyond this number causes the pitch of the sound to be raised. It may then be stated that the pitch of a sound is determined completely by its frequency. In other words, the greater the frequency, the higher will be the pitch of sound. As we have encountered in our general study of wave motions, the following relation is applicable to sound waves:

$$\text{Wavelength} = \frac{\text{Velocity}}{\text{Frequency}}$$

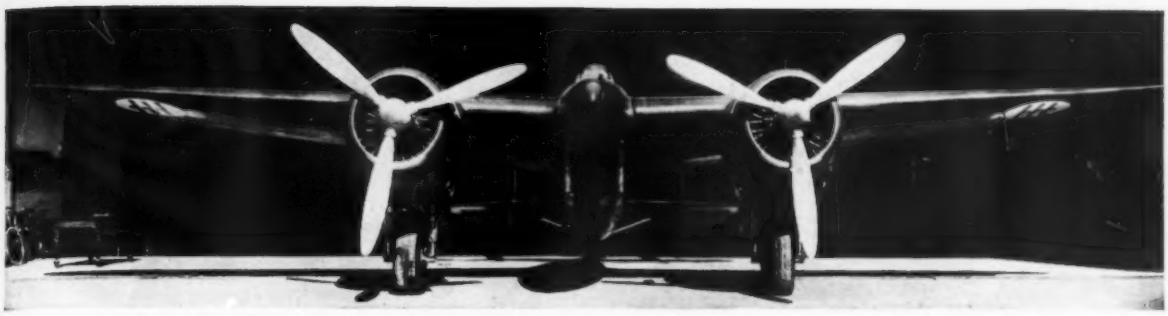
The loudness of a

(Continued on page 52)



Typical chart for the classification of sound

Fig. 1



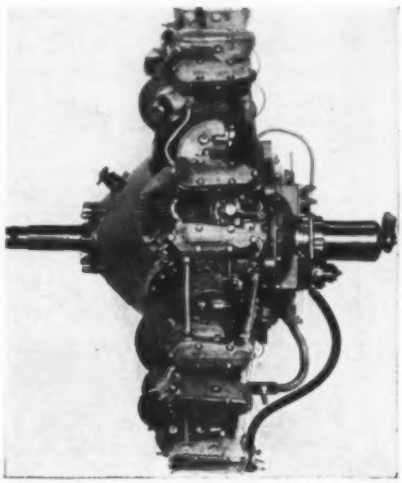
The Italian Breda 88 bomber with two 950 hp. Gnome Rhone engines which has a speed of 321 m.p.h.

FRONTIERS

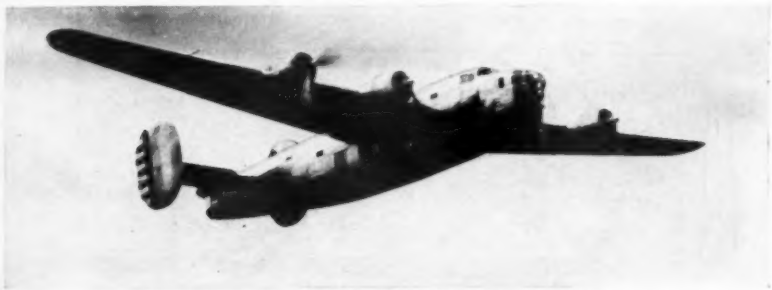
BY ROBERT MORRISON

HERE is France's greatest interceptor: introducing the Dewoitine D.520; high speed, low-wing single seater that was France's chief weapon in her attempts to prevent Hitler's bombers from driving into French territory. It put up a staunch fight in the early days of the fighting when things were at their worst and took much of the glory away from the American Curtiss interceptors that have done so well in Europe. Like the evolution of most pursuits the prototype was flown in 1938, later refinements were made in 1939 and by 1940 the design was developed into the finest fighter France ever produced. While the first batch of Dewoitines were being put through a year of service tests, the Societe Nationale de Constructions Aeronautiques du Midi (just one of several government-owned aircraft factories) tooled up for the rapid production of the sleek little speed demon, but dangerously late to produce the quantities France needed to retain her freedom.

The new Curtiss SBC-4 dive bomber. (Internl.)



The Guiberson diesel engine is said to be more efficient than the gasoline type. (Acme)



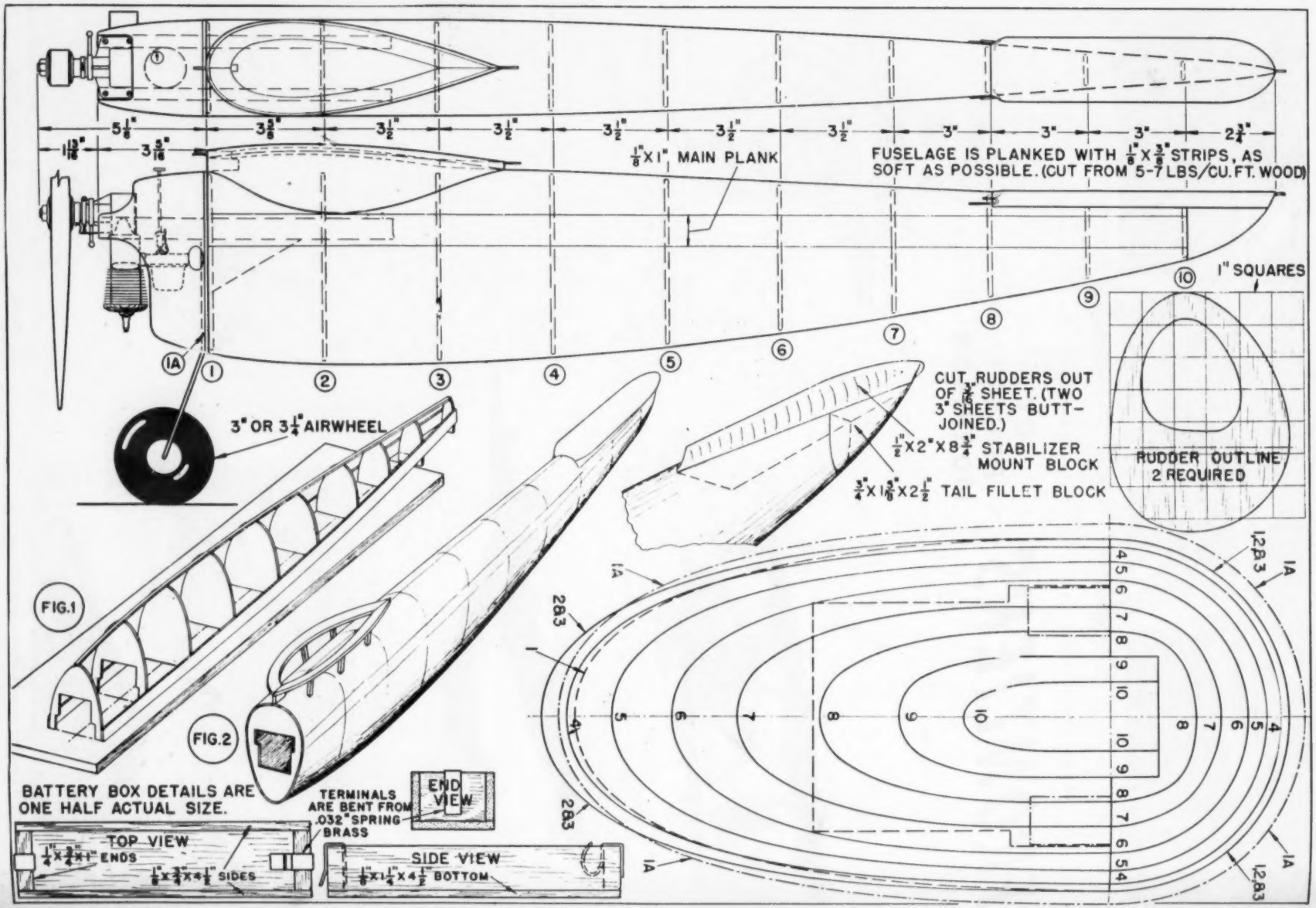
The new four engine U.S. Army Consolidated bomber

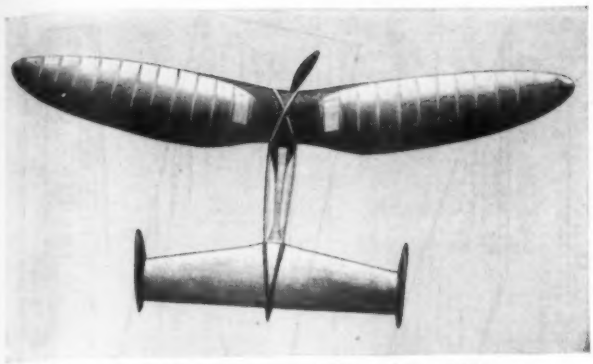
There is only one thing that can stop a German bomber and that is an interceptor. (In our opinion the anti-aircraft gun in the present war is 90% useless . . . now that should start an argument.) The interceptor becomes especially important in this instance because France was not able to build up her bombing squadrons to the point where a counter-attack would be very effective, considering the number of planes Hitler has in his "backyard." Nor has

(Continued on page 67)

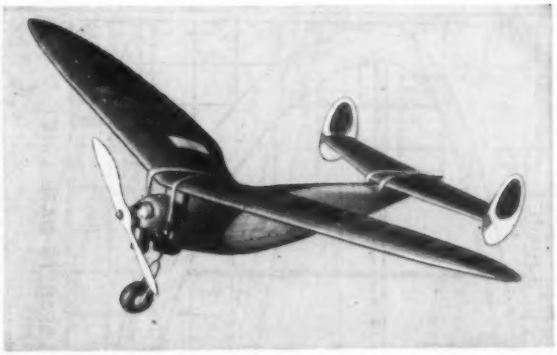
The new Ercoupe turns by means of its ailerons

The Sikorsky Helicopter rises in vertical flight


5 1/8"
3 5/8"
3 1/2"
3 1/2"
3 1/2"
3 1/2"
3 1/2"
3"
3"
3"
2 3/4"
1 13/16"
3 5/16"
1/8"X1" MAIN PLANK
FUSELAGE IS PLANKED WITH 1/8"X3/8" STRIPS, AS SOFT AS POSSIBLE. (CUT FROM 5-7 LBS/CU.FT. WOOD)
1" SQUARES
RUDDER OUTLINE 2 REQUIRED
CUT RUDDERS OUT OF 3/16" SHEET. (TWO 3" SHEETS BUTT-JOINED.)
1/2"X2"X8 3/4" STABILIZER MOUNT BLOCK
3/4"X1 3/8"X2 1/2" TAIL FILLET BLOCK
3" OR 3 1/4" AIRWHEEL
FIG.1
FIG.2
BATTERY BOX DETAILS ARE ONE HALF ACTUAL SIZE.
TOP VIEW
1/4"X3/4"X1" ENDS
1/8"X3/4"X4 1/2" SIDES
TERMINALS ARE BENT FROM .032" SPRING BRASS
END VIEW
SIDE VIEW
1/8"X1 1/4"X4 1/2" BOTTOM



Twin rudders and large stabilizer give stability



This stable Class "C" one wheeler is a fine soarer

How To Build a Distinctive Stable One Wheeler that Will Turn In Consistent Winning Flights

BUILDING THE FALCON

By PAUL PLECAN

EVER since the days of Maxwell Bassett and Joe Kovel, gas model builders have all strived towards a common goal—a gas job that would be perfectly stable, climb like a sky rocket, and have a sinking speed so low that it would make a sailplane pilot turn "green with envy." Although this month's gas model is not the ultimate in perfection, it nevertheless incorporates many features that the author feels are necessary in a high-performance gas job.

First and most important is the wing. A moderate aspect ratio (6:1 or 7:1) is used for strength. Although a higher aspect ratio increases efficiency, it also makes the wing more susceptible to "folding in two" in violent, and sometimes accidental maneuvers. Elliptical tips are used to lessen tip vortices. Little area is used in the center section, as it is not very efficient due to its proximity to the turbulence around the fuselage and wing mount. The Grant X-10 airfoil is used in the wing where the chord and efficiency are g r e a t e s t, modified Clark Y sections being used at the center and tips for least drag.

Since the fuselage is planked, it is light and strong. The clean design, plus the one-wheel landing gear, minimizes drag to a great extent. A large stabilizer is used in conjunction with a moderately long moment arm. To decrease tip vortices, and for g e n e r a l simplicity, twin rudders are used. The twin rudders give the needed ground stability, since the new rulings require that gas models land without nosing over or falling off on one wing tip.

A high thrust line, bellied-down fuselage and slightly parasol wing mount complete the requirements for stability. The one wheel placed far forward makes nose-overs or ground-loops almost impossible.

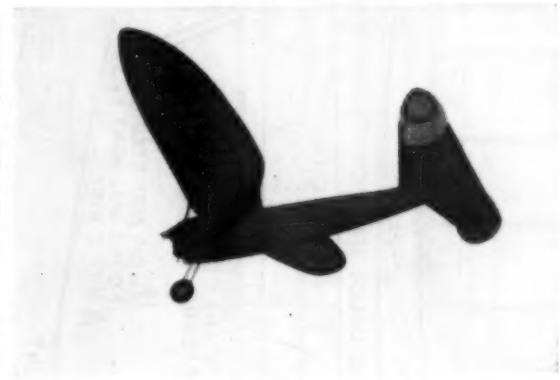
Construction of the model is simple, due to the fact that full size ribs, bulkheads and other parts are given. If you contemplate building a "Falcon," read through this article and study the plans to familiarize yourself with them before beginning construction.

Fuselage construction begins with the cutting out of all necessary bulkheads from 1/8" sheet stock. Do not forget to mark off horizontal and vertical centerlines on each bulkhead, because each one has to be sliced along the horizontal centerline before actual construction begins. Bulkhead 1A is 1/8" plywood, with only two holes (for motor bearers) cut into it. Bulkheads 1 and 2 are cut out as shown in sketch to make room for the rear end of the motor unit.

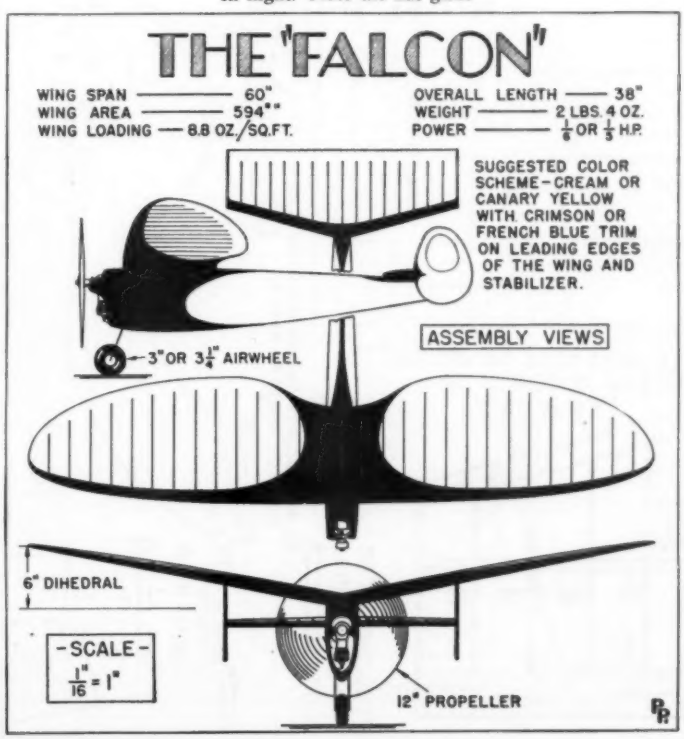
Draw a centerline on a board about 30" long and space off bulkheads 1 to 8. All the bottom halves of bulkheads 1 to 8 are now pinned to the board, followed by the cementing of the two 1/8" x 1" main planking strips on each side. Bulkheads 9 and 10 can now be cemented in place past the end of the board, since they project downwards past the bottom of the main planks. Their horizontal centerlines should be flush with the bottom edges of the main planks.

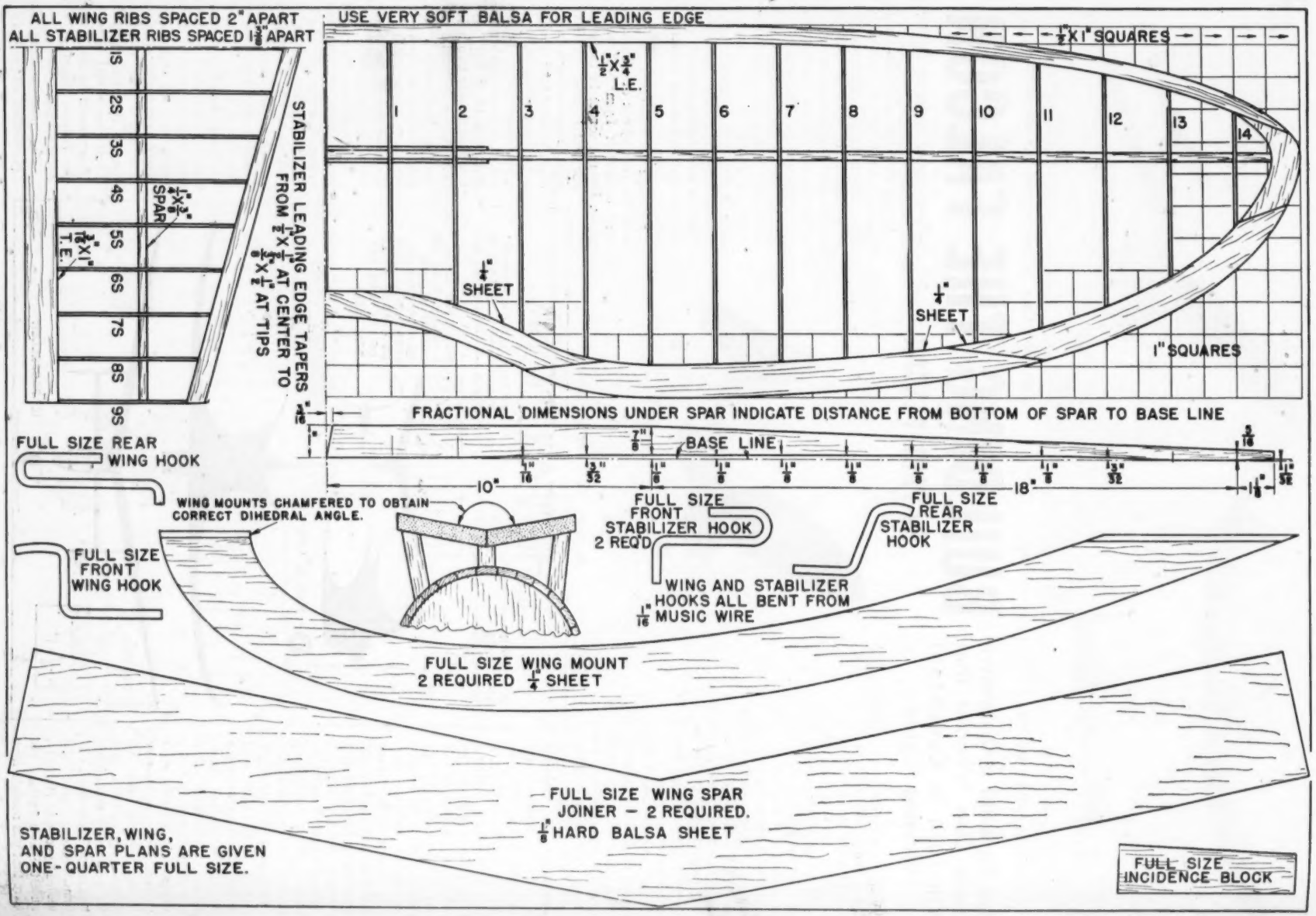
The pins holding the

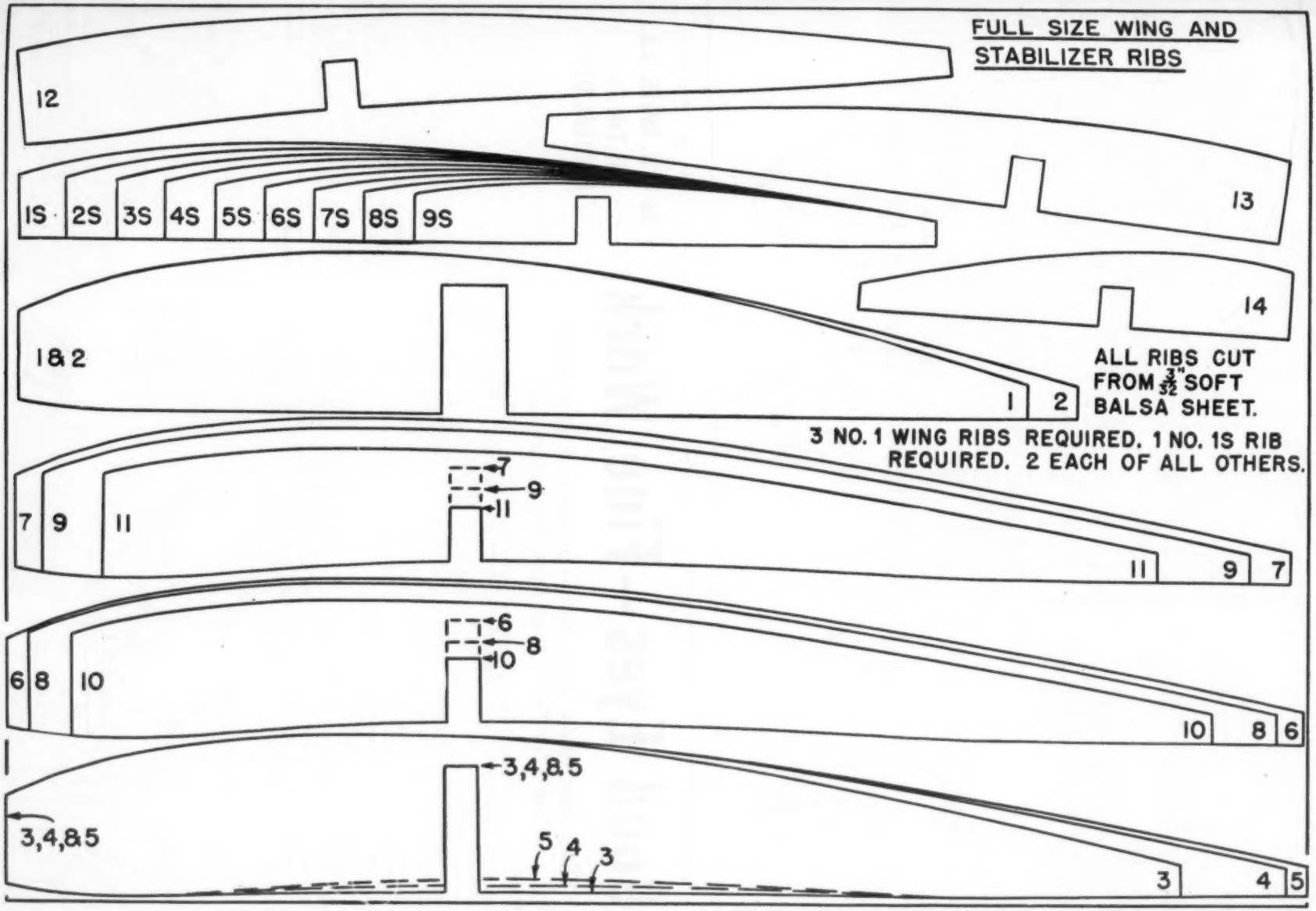
(Continued on page 70)

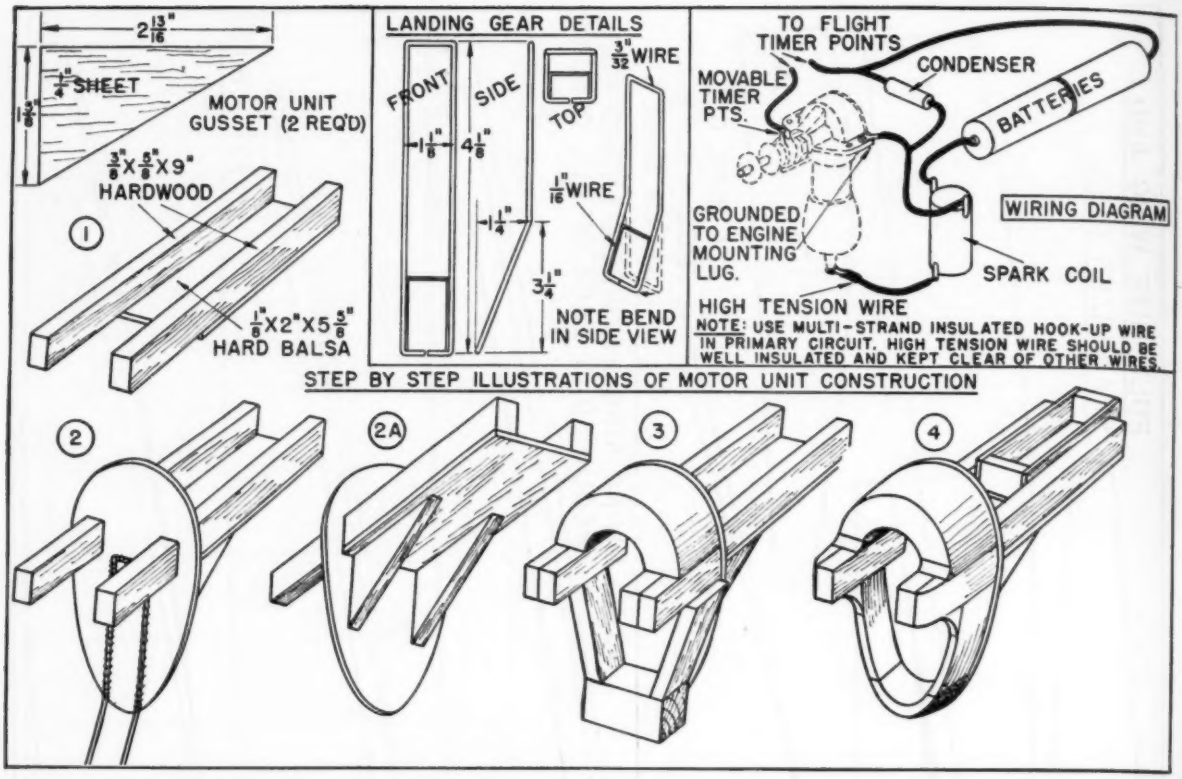


In flight. Note the flat glide


THE "FALCON"
WING SPAN — 60"
WING AREA — 594"
WING LOADING — 8.8 OZ./SQ.FT.
OVERALL LENGTH — 38"
WEIGHT — 2 LBS. 4 OZ.
POWER — 1/6 OR 1/5 H.P.
SUGGESTED COLOR SCHEME—CREAM OR CANARY YELLOW WITH CRIMSON OR FRENCH BLUE TRIM ON LEADING EDGES OF THE WING AND STABILIZER.
ASSEMBLY VIEWS
3" OR 3 1/4" AIRWHEEL
6" DIHEDRAL
-SCALE-
1" / 16 = 1"
12" PROPELLER


ALL WING RIBS SPACED 2" APART
ALL STABILIZER RIBS SPACED 1⅜" APART
USE VERY SOFT BALSA FOR LEADING EDGE
1/2"X1" SQUARES
1S
2S
3S
4S
5S
6S
7S
8S
9S
1/4"X3/8" SPAR
1/2"X1" T.E.
STABILIZER LEADING EDGE TAPERS FROM 1/2"X1/4" AT CENTER TO 3/8"X1/2" AT TIPS
1/2"X3/4" L.E.
1
2
3
4
5
6
7
8
9
10
11
12
13
14
1/4" SHEET
1/4" SHEET
1" SQUARES
FRACTIONAL DIMENSIONS UNDER SPAR INDICATE DISTANCE FROM BOTTOM OF SPAR TO BASE LINE
7/8"
BASE LINE
3/16
1/16"
3/32"
1/8"
1/8"
1/8"
1/8"
1/8"
1/8"
1/8"
3/32"
1/32"
10"
18"
1⅛"
FULL SIZE REAR WING HOOK
WING MOUNTS CHAMFERED TO OBTAIN CORRECT DIHEDRAL ANGLE.
FULL SIZE FRONT STABILIZER HOOK 2 REQ'D
FULL SIZE REAR STABILIZER HOOK
FULL SIZE FRONT WING HOOK
WING AND STABILIZER HOOKS ALL BENT FROM 1/16" MUSIC WIRE
FULL SIZE WING MOUNT 2 REQUIRED 1/4" SHEET
FULL SIZE WING SPAR JOINER — 2 REQUIRED.
1/8" HARD BALSA SHEET
STABILIZER, WING, AND SPAR PLANS ARE GIVEN ONE-QUARTER FULL SIZE.
FULL SIZE INCIDENCE BLOCK


FULL SIZE WING AND
STABILIZER RIBS
12
13
14
1S 2S 3S 4S 5S 6S 7S 8S 9S
1&2
1 2
ALL RIBS CUT
FROM 3/32" SOFT
BALSA SHEET.
3 NO. 1 WING RIBS REQUIRED. 1 NO. 1S RIB
REQUIRED. 2 EACH OF ALL OTHERS.
7 9 11
7
9
11
11 9 7
6 8 10
6
8
10
10 8 6
3,4,&5
3,4,&5
5 4 3
3 4 5



Good Eyes--Fine Work

By E. K. SMITH, O.D.
As Told To
F. CONDE OTT

Blind Men Make Poor Model Builders—A Few Hints That Will Save Your Eyes for Future Use

"WHAT a peach of a plane! Just look at that swell construction detail. Gee, with my clumsy hands, I couldn't do a job like that for a million dollars."

Perhaps a hundred people make a remark like that every day. Always "the hands, the hands." Sure, the hands are important, very important; but how about the eyes? They are pretty important, too, yet nobody ever seems to give them a thought.

Let's take "time out" for a moment to think *and talk* about the eyes. Come on, drop that blueprint and get the pins out of your mouth. While we're talking you can peel some of the cement from your fingers—you know—that "model builders' sunburn."

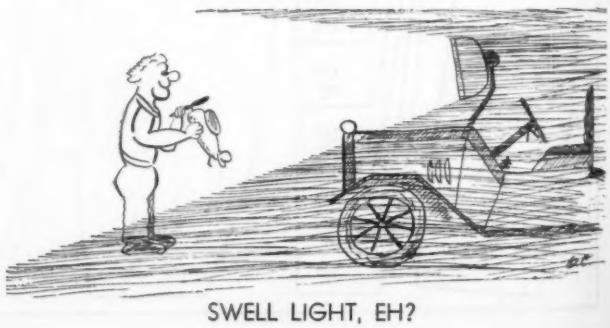
We'll start with facts so simple you'll laugh, yet I'll wager a Super-Cyclone against a couple of strands of 1/32" rubber that you never even thought of them.

Long before you touch a piece of material you've already spent a lot of time reading plans and studying blueprints. Why, your eyes have two strikes on them before your hands even get to the plate, so to say. Also, the chances are 50-50 (striking an average for the twelve months) that you'll be doing most of your model work under artificial lights.

Both the pre-construction studies and the concentrated craftsmanship that follow it mean that the eyes get plenty of pushing around. Perhaps we can make that necessary abuse a bit less severe with a few timely hints which will help to keep good eyes good and poorer eyes from becoming worse.

Concentration with the eyes means using all our sight in a small area, often for long hours at a time. Were you to hold a heavy weight at arm's length for that same time you'd almost expect your arm to fall off from sheer muscle fatigue. Yet, inside and surrounding the eyes, there are many muscles and nerves no different, except in size, than those you might find in your arm or chest.

(Continued on page 56)



SWELL LIGHT, EH?

Martin Navy Patrol Bomber XPMB-1. It has a span of 118 feet and weighs 18 tons

FLASH-NEWS

SPECIAL TO MODEL AIRPLANE NEWS:

THE United States Army Air Corps has awarded a contract to the Douglas Aircraft Company for ONE THOUSAND model DC-3 twin-engine transports. Actual construction on the first 200 will begin immediately with options on the remaining 800 taken up as each group is completed. Use: PARACHUTE TROOPS!

Once again the aerial armies of Europe have cashed in on a tactical method original with this country. Russia, in her attack on Roumania's Bessarabia province, has used parachute tanks which were dropped from giant bombers behind the Roumanian frontier. Automobiles and small tanks were experimented with in this country over six years ago when the huge Burnelli flying wing was utilized.

A fleet of 40 Bristol Blenhiem and 160 Spitfire fighters all manufactured by Canadian aircraft plants has been completed and is being held in readiness for word from London. Construction is being rushed on hundreds more of both types.

Backlog of the nation's newest big-time manufacturer of military planes now stands at $84,000,000. Orders for England in the amount of 800 trainers, and for the U. S. Air Corps for high-speed twin-engine attack bombers have swelled North American Aviation's backlog to a point where it is necessary to operate two nine-hour shifts daily and a third shift five nights weekly. Construction has begun on another huge addition adjacent to the tremendous unit just completed four months ago!

Inauguration of a definite trend may be assumed from the announcement that United Airlines has appointed Charles P. Graddick for the promotion of engineering and sales in cargo transportation. Use of high-flying fast-moving cargo ships will bring to the airlines the last missing link in its offer of complete railroad facilities in the air.

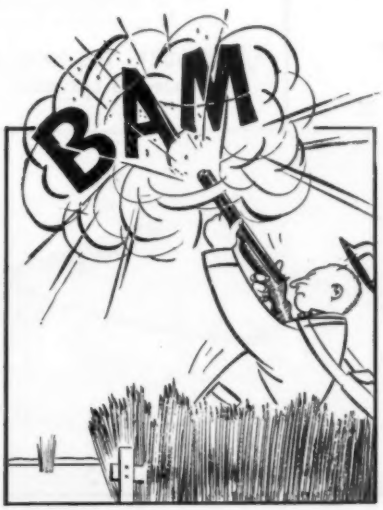
Comes the end of one of the greatest names in aviation, and one of the most rapidly rising. The Fokker plant in Rotterdam, Holland, was shattered to the ground by German air bombs as was the small but efficient Koolhoven works. Actual photographs of the Koolhoven ruins have been widely published in this country. At first blush it appears a tragedy but a second sight brings the realization that had Germany taken over these plants and utilized them for the construction of swastica-clad aerial terrors, the effect might have been more ghastly. Although mainly manufacturers of military planes, the Fokker Company had preliminary designs in the mock-up stage for a giant tricycle transport of the high-wing type which undoubtedly would have done much for the betterment and advancement of peacetime passenger transportation. Spawned in war, and now dead by war's hands, etches the name of Fokker into history.

First government school for instructions in the handling of seaplanes has been installed in San Pedro, California, the port of Los Angeles. A maximum enrollment of 50 young men and women, from 18 to 25 years of age, has been provided for. The course will require 72 hours of ground school and 35 hours in the air after which private pilots' licenses will be granted.

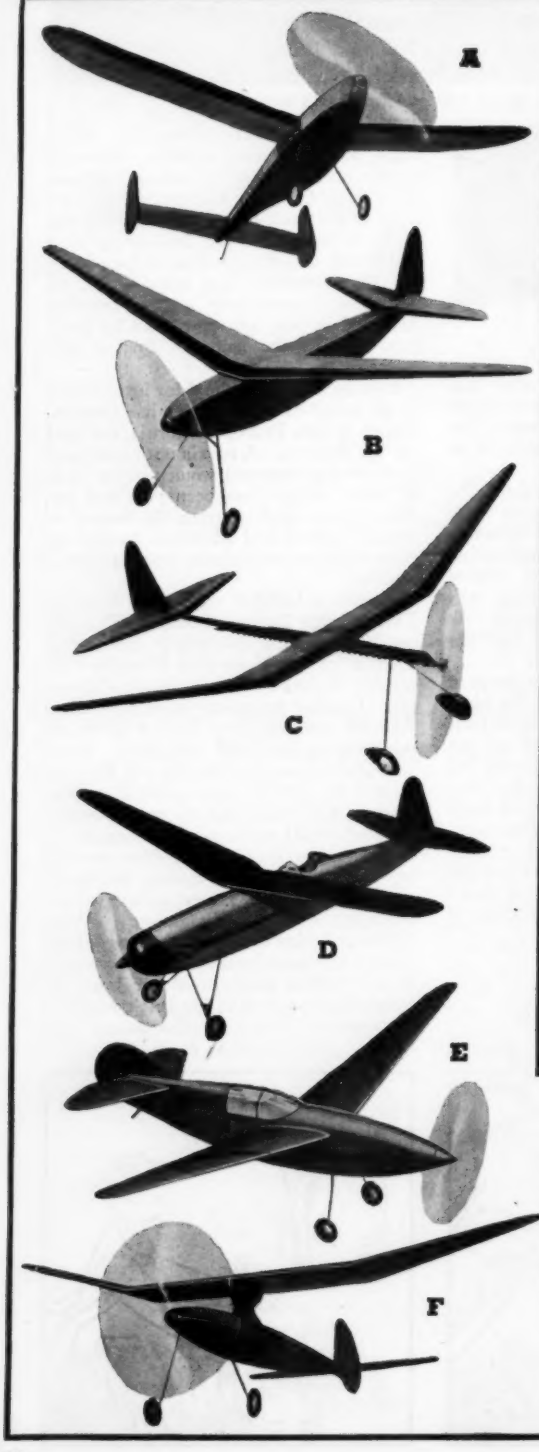
Maiden scheduled passenger flight of TWA's huge Boeing "Stratoliner" ended on New York's $43,000,000 LaGuardia Field a fraction more than 14 hours after leaving Burbank (Los Angeles), California. Regular schedules went into effect July 8th and call for a time of 13 hrs. 15 minutes for the 2600 mile trip. When schedules began, the big ship left Burbank at 6 P.M. (P.S.T.) and arrived in New York at 8:03 (E. S. T.) the next morning. A speed of 215 miles per hour was maintained. Five of the huge four-motored pressure-cabin ships, costing $1,500,000, operated this, the fastest scheduled air route in the history of aviation.

Howard Hughes has been awarded the Octave Chanute Award for 1940 according to a statement made by Major James H. Doolittle, president of the Institute of the Aeronautical Sciences. The award com-

(Continued on page 72)



NEW! Scientific's 25" WINGSPAN FLYING DEMON Squadron



A. SKYSCRAPER. In her trial flights she consistently made altitude flights of over 500 feet. Fuselage, brown and white, wings and tail surfaces all white with brown trim. Her twin rudders assure greater spiral stability. 25¢
COMPLETE KIT POSTPAID OR AT YOUR DEALER . . .

B. FURY. A really beautiful model that gives much pleasure building, and hours of enjoyment in the air. The Fury is easy to build and a real flyer too. Wing and stabilizer light blue with red trim. Body and rudder all red. 25¢
COMPLETE KIT POSTPAID OR AT YOUR DEALER . . .

C. SCIENTIFIC R. O. G. An advanced type R. O. G., with built up wing and tail surfaces. Look at that polyhedral wing, the wheel pants. Wing and stabilizer all yellow, trimmed with blue, rudder and stick blue. 25¢
COMPLETE KIT POSTPAID OR AT YOUR DEALER . . .

D. SPEEDSTER. A speedy, graceful model that is a consistent and steady performer. Takes off from the ground within three feet. Parasol wing type, with open cockpit. Red wing and tail surfaces, fuselage white with red trim. 25¢
COMPLETE KIT POSTPAID OR AT YOUR DEALER . . .

E. LIGHTNING. Everything the name implies. The Lightning is one of the fastest flying models ever designed. Easy to build, too. Adding to her streamlined beauty are red lightning flashes on her yellow wings and fuselage. 25¢
COMPLETE KIT POSTPAID OR AT YOUR DEALER . . .

F. RAVEN. Easy to construct, even for a beginner. Her diamond shaped fuselage and elevated polyhedral wing assures contest winning flights. Fuselage and rudder covered with light blue tissue, wings and stabilizer yellow. 25¢
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G. MISS WORLD'S FAIR. New 24" model, built on the exact scale of her larger sisters which gave such satisfaction last year. Up-to-date features include a high aspect-ratio swept back wing and trim rudders. 25¢
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50" Miss World's Fair—$1.50 p.p.

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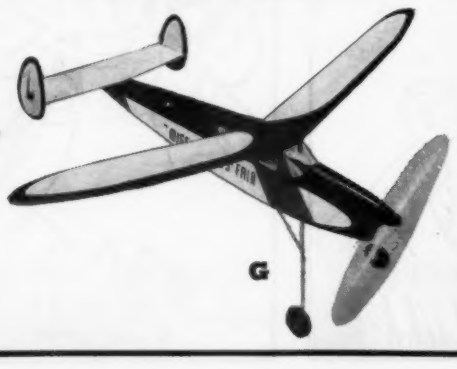

NEW

40" WINGSPAN

Fellows! Here's ... climbing three hundred ... automatically! But that's all! ... endurance model that ... ful wing, elevated ... lage measuring 28 ... hood. With all these ... would imagine it ... so simple that anyone ...

Kit contains ... washer, tissue (2 colors) ... and automatic trap ...

Illustrated at right: ... closed. Before releasing ... fuselage. After approximately ...

"ENGI...

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SEE YOU ... SCIETI...

218-22 M...

Scientific's Amazing New

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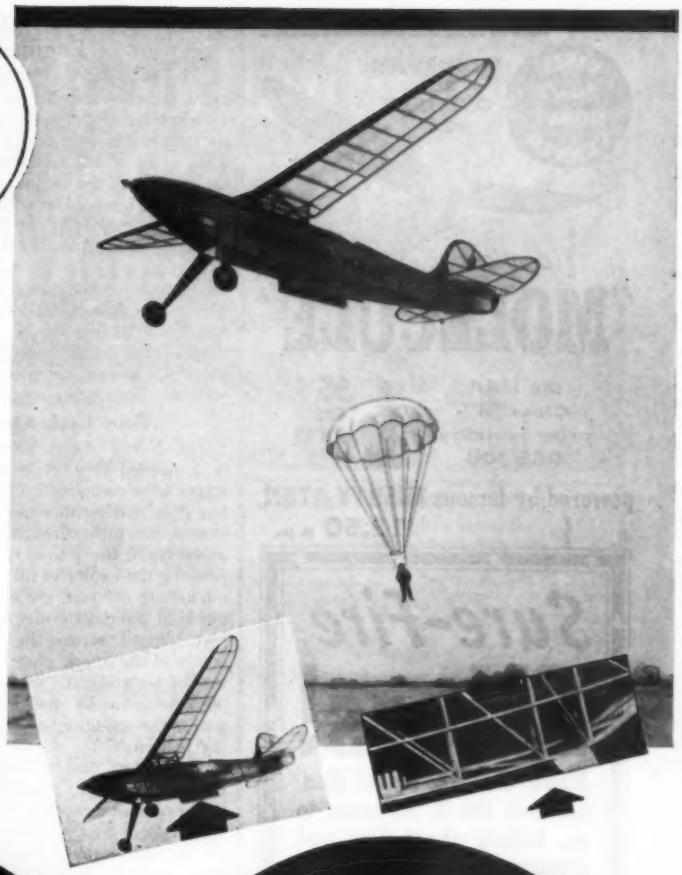
Here's ...'s new "Parachute Plane", packed full of new thrills! After ... more, out comes a pilot with his parachute—and it's all done ...! But th... all! Besides this novel parachute feature, you have a trim ...odel that ...ly make flights of a mile or more. Look at the long grace- ...rated and ...ble too; that classy open cockpit in a slim streamlined fuse- ...g 28 in... length. It will be the envy of every fellow in the neighbor- ...all these ...tures incorporated in this new model airplane thrill, one ...e it wo... difficult to build; but such is not the case. The construction is ...t anyone ...le or no experience can easily build it.

...ains new ...terials, including a machine cut propeller, ball bearing ... (2 col... ...ed wire parts, all parts required for constructing parachute ...c trap d..., ready-made pilot, and a full size, easily understood plan.



...ht: Auth... 1938. Parachute and pilot are placed in chamber beneath airplane and trap door ...eleasing ... ...ction timer is set by pushing forward the handle, protruding through bottom of ...approximat... ...ing, the door automatically opens and the pilot and parachute slowly drift earthward. ...Above, right: Rubber friction timer, easily constructed with ... ...d in the kit, makes the trap door open automatically.

"E...GN"

...a—50" ...—372 sq. in.
Length ...—34½"
...E" $... POSTPAID

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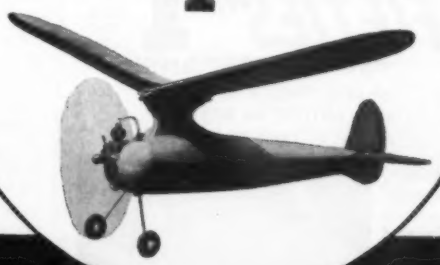

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Fundamentals of Gas Model Engines

(Continued from page 10)

gases must be expelled from the cylinder. This completes the cycle and the explosive mixture is drawn in then for the next cycle. This series of actions takes place one after the other until the engine stops. A gasoline motor is a mechanism which will carry out this cycle repeatedly in the course of its operation and from which power is derived.

There are two types of gasoline engines which use this cycle; one the *four cycle* motor, completing the cycle in two revolutions of the crank shaft and the other the *two cycle* engine, completing it in one revolution. Both types are used in models.

Four Cycle Operation

Fig. No. 3 shows a cut-away diagram of a normal four cycle motor in various stages of a complete cycle. In A, the piston P is moving down, sucking in the explosive mixture through the open intake valve I. B, the piston is moving up compressing the explosive mixture. Both valves, intake and exhaust, are closed. C, the piston is at top dead center and the spark has just jumped across the gap between the points of the spark plug to ignite the mixture of air and gas. D, the piston has been pushed down by the burning expanding gases, the exhaust valve E has opened at the bottom of the stroke and the piston is on its way up, pushing the burned gases out the exhaust port. At the top of the stroke the used gases are expelled and the piston starts down again, sucking in a new explosive charge as shown in A. Thus one cycle has been completed in two revolutions of the shaft and another one started.

The mechanical features required for this action, thus, may be listed as follows: 1. Cylinder Y; 2. Piston P; 3. Connecting rod R; 4. Crank shaft S; 5. Crank case O; 6. Intake port and valve I; 7. Exhaust port and valve E; 8. Spark plug K; 9. Valve operating mechanism M.

The valve-operating mechanism M is shown in Diagram 3. It consists of a rocker arm A for each valve, on the top of the cylinder. The rod M extends from one end of this arm down to a cam on a shaft which is geared to the crank-shaft. As this cam-shaft revolves with the crank-shaft, the cam pushes up the rod M, one end of the rocker arm A, which in turn pushes down the valve. Both intake and exhaust valves are operated in the same manner.

Inasmuch as the cam-shaft is geared to the crank-shaft, the valves operate at the moment when the piston is at the same point in each stroke. For instance, at the bottom of the explosion stroke the exhaust valve is open so that the burned gases may pass out the exhaust port. The exhaust valve closes when the piston is at the top of its stroke and ready to suck in a fresh charge of the explosive mixture. When the exhaust valve closes the intake valve opens, allowing this new charge to enter the cylinder.

Two other supplementary units that have not been mentioned are also required. They are: 1. A means of producing the proper mixture of gas and air and 2. A means of generating and timing the high tension (voltage) current that produces the spark between the points of the plug.

The proper gas-air mixture is produced by a specially designed mixing valve or by a device known as a "carburetor." The high voltage current, in the case of gas model motors, is generated by a system of dry batteries, spark coil and condenser. The spark is produced at the proper time by a "timer" in connection with the crank-shaft of the engine. Both of these supplementary units will be explained in detail later.

Two Cycle Operation

Figure 4 shows a diagram of a two cycle motor in various stages of its cycle of operations. The advantage of this type of motor is that no valve-operating mechanism is necessary, thus moving parts and complication are reduced. Instead of valves, intake port I and exhaust port E are located in the cylinder wall. In A, figure 4, the charge has been taken into the cylinder and the piston is at top center and is compressing the charge. At this point the spark plug K fires, igniting the charge within the cylinder. The piston is forced down by the explosion.

Figure B shows the piston on the way down, exerting its turning effort through the connecting rod R, through the crank C and the shaft S. In diagram C the piston has reached the bottom of its stroke, passing below the exhaust and intake ports. The top of the piston reaches the exhaust port first and the burned gases pass out. As the piston proceeds to the position shown, the intake port is gradually opened, allowing the fresh charge of explosive gas and air to enter the cylinder to replace the burned gases which have passed out the exhaust port.

This fresh charge is forced into the cylinder by the pressure in the crank-case caused by the piston moving down. The intake charge also is induced to enter the cylinder because of the suction caused by the exhaust gas passing out of the exhaust port. As the crank-shaft turns and the crank C starts to rise, the piston is pushed upward, closing the intake and exhaust ports and the fresh charge is compressed. When the piston reaches the top of its stroke, the next charge has been fully compressed as shown in A, figure 4. At this point the spark jumps across between the points of the spark plug and the charge is ignited, thus starting another cycle.

In diagram A the piston has moved upward to the top of its stroke. In doing so it has created a suction or low-pressure within the crank-case. It is this suction which causes the explosive mixture to be drawn through the carburetor or mixing valve and to pass through the intake pipe L into the crank-case. As explained above, the gas passes from the crank-case through the intake port in the cylinder when the piston has reached the bottom of its stroke. Each time the piston rises to the top of the stroke gas is drawn in through the mixing valve to the crank-case and each time it reaches the bottom of the stroke the pressure which it causes in the crank-case fires the gas through the intake port into the cylinder.

With this form of operation a complete cycle of firing and exhausting the gas takes place in one revolution of the crank-shaft. Thus in a two cycle engine twice as many explosives take place for a given number

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of revolutions as in the case of a four cycle motor. Under these conditions, one naturally would suppose that twice as much power is developed by the two cycle engine. This is not so, though, when properly designed and regulated the two cycle engine will deliver a little more power for its size than a four cycle one.

If the cylinder of a two cycle engine could be perfectly scavaged of old gases and a complete charge of new gas could be injected to replace it, then this type of motor would give approximately twice the power of the four cycle engine. However, with each revolution a certain amount of burned gas remains in the cylinder. The new explosive charge enters the cylinder and mixes with this gas. Thus the volume of fresh gas is not equal to the total displacement of the cylinder but approximately to only half the displacement; half the gas which is compressed and fired being residue of burned gas from the previous explosion.

The problem of creating a two cycle engine lies in designing it in such a manner that as much as possible of the exhaust gas passes out of the cylinder at the end of the stroke and as much fresh gas as possible enters the cylinder to be fired on the succeeding stroke. Upon the efficiency of this scavaging process depends the power efficiency of the engine. The exhaust and intake ports must be very carefully located in order to create the best possible conditions. This is one of the greatest problems confronting motor designers and many experiments must be carried out in order to determine the most efficient location of these ports.

Figure 5 shows a two cycle gas engine with part of it cut away so that the internal parts may be seen. It clearly shows the piston with the connecting rod attached to it by means of a wrist-pin, and its other end fastened to the crank of the shaft. The intake and exhaust ports are not visible. At the rear of the motor is the gas tank attached to the bottom of the air intake tube.

The vertical shaft passing through the tube is the screw by means of which the needle valve is adjusted. This regulates the gas-air mixture. In front of the crankcase on the shaft may be seen the timer mechanism. In front of this the shaft extends outward so that a propeller may be mounted on it and fastened with the washer and nut shown at the extreme left of the picture. Around the cylinder are cooling fins. These are required to keep the motor from over-heating. Great heat is developed from the explosions within the cylinder, which may be radiated from the cylinder walls and carried away by the air in order to maintain proper running temperature.

All designs of gas engines are based on the principles which have just been explained and function in the same general manner. The only difference is in the mechanical design; such as the location of the ports and the shape and size of the parts and their relative position. Some engines locate the intake at the center of the piston, a little plunger operating to open or close it under the natural pressure induced within the cylinder.

Next month details of the supplementary units will be explained and discussed.

The Nationals On Parade

(Continued from page 21)

radio controls and crashed shortly after the take-off. Joseph Raspante, Brooklyn, N.Y., with his Herkimer Twin powered R.C. job, put his 15-lb. design through the paces to total 34 points and carry third place honors. This was Joe's second attempt at the Nationals and his greatly improved model and elaborate dial control system successfully carried through, with the help of Jesse Bieberman as his radio operator. Sal Tabi, the faithful assistant, made last check-ups.

July 5th saw the cabin models at the indoor armory, competing in the Cabin Event. H. Kaczynski of Detroit won the Junior Event; G. Cain of Hyde Park, Mass., the Senior; E. Leshner of Philadelphia, the Open.

On July 6th the Mulvihill Stick, Class B and Moffett Finals Events were run off. This was also an excellent day for flying; fortunately during the whole meet the weather was perfect. Your observer counted as many as 25 stick and gas models in the air at one time. They were more or less bunched together and looked like a flock of seagulls or buzzards circling around a carcass.

The crowd was especially thrilled when two ships collided in mid-air, locked noses and spun down in a "fond embrace." One little girl among the spectators was heard to remark: "Why did they do that for, mama?" Youngsters of today are certainly getting an education of which the present-day model fan never had the advantage early in life.

Some unusually fine flights were made in the Mulvihill Event; in fact, this year's event was more productive of designs of excellent flying qualities than any other national contest.

Some more of the unusual features of the meet were:

A complete soundproof workshop, with benches, vices, tools and soldering facilities available 24 hours a day for all contestants. Free bus service for each day to and from the outdoor site and the International Amphitheatre was provided. Box lunches complete with choice of sandwiches and beverage were provided by Mr. John J. Russo, manager of the Trade Show and the International Amphitheatre, who made the indoor site available for the contest. Most welcome was the 1,500 gallon water tank to whet the thirst of the outdoor fliers while under the scorching sun.

One of the greatest services tendered the vast number of gas model contestants was the 2-way radio communication system. Of the 243 models reported lost, 215 were recovered as a result of this newly inaugurated service. Operating on 2 1/2 meters, 6 portable mobile tranceivers, 3 roving portable tranceivers and a 50 watt, the home station was placed in operation by the Chicago Area Radio Club Council. The idea was formulated by A. G. Davis, who deserved a hearty vote of thanks. With the cooperation of N. D. MacConnell and Warren Clark of the Radio Council, details were completed and 16 licensed "hams" were assigned to carry out this task.

Strategically placed in the direction of the wind were the roving cars. As models drifted beyond the field, the home station (as they received the reports by the operators with the small radios on the field), assigned a car to pursue and recover models. On the first day of operation 68 of 75 reported lost were found.

The coordination of field operation was speeded up as a result of this 2-way radio. Constant reports of timers and judges were relayed to the announcer at the P.A. system to keep the public advised of the field activity.

A number of dealers brought thousands of propellers to the field which they sold, as needed, to the contestants. One of the pictures shows the elaborate array displayed by one of them.

Many prominent and interesting model personalities were on hand, among whom was Dick Korda of Cleveland, 1939 world title holder in the Wakefield Finals, who tried out his latest design. Others were: Jimmie Noonan of the Milwaukee Aeronuts, who entered his Stinson 105 in the Flying Scale. Ed Lidgard, Chicago's outstanding rubber powered authority, who is the proxy captain for the International Moffett Team; 7 from New Zealand, 2 from South Africa and 1 from England.

Clyde Lucas, famous dance band leader and model builder, was entered in the "C" gas with his own design. This was Clyde's first entry in a National meet, although he has been a builder for several years. In his tours throughout the nation Clyde frequently conducts scale model meets and is an ardent admirer of radio control.

The Balsa Benders of the Terre Haute, Ind. Y.M.C.A., were on hand with a contingent of four Exchange Club winners, Bernard Coyner, Marshall Hayes, Bill De Mugent and Bill Kust. Green Bay, Wisconsin, Model Aero Club had Cliff Hyska, Bob Cowles and Jerry Roberts present. From Lorain came the Ohio State Champion, Jim Slater, and his 7 buddies. Ralph Rapien of Chicago had an original Class A gas job that came apart and packed in a small carrying case: Lieth Potter of Nevada, and the Fremont, Nebraska, Flying Fools; Wayne Grant, Jim Frasier, Jack Shields, with original B & C gas jobs, were all having a swell time on all-expense paid tours. The Fremont group is an Academy Chapter with 120 members. The Milwaukee Gas Model Association, came out 50 strong with State Champ, Kenney Lane and Alex Tybarski, the leader. Phil Sonheim and his R.C. model came from Mellsville, Wis.

In car and trailer from far-off Tacoma, Washington, came Martin Stockwell, Charles Holinger, Herman Cole as representatives of their home state. I.G.M.A.A. Unit No. 1 from Pittsburgh, Pa., and a caravan of cars and trailers twenty strong camped at the flying field. Lucky boys, recently a portion of Butler Field was ceded them for model flying. (No Blitzkrieg.)

Utilizing the famous "Yahoodi" nickname, Jerry Starlof of the Brooklyn Skyscrapers had his new Class A Bantam-

BEG PARDON—

In the Scientific Model Airplane Co. advertisement, page 37 August issue, the price of the Dennymite Motor (Airstream Unit) appeared as $3.85. This was a typographical error as the correct price is $13.85.

Complete WITH MOTOR

14.95

MOTOR, WHEELS, PROPELLER, FLIGHT TIMER AND KIT

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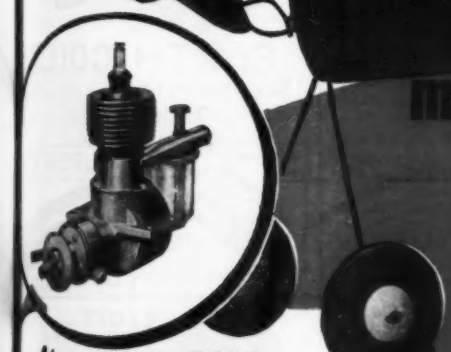
AIRPLANE KIT ONLY
Less Wheels and Propeller

RITE-PITCH PROPELLER



MEGOW'S *New Gas-Powered* AeroChamp

and the New Megow "199" MOTOR

Now! A gas model airplane COMPLETE WITH MOTOR . . . and what a motor . . . Megow's new "199"!

Heretofore airplane models have not been designed for any particular motor, nor motors for any particular models, and performance has depended on the individual builder's ability to make the two fit and work together efficiently. Now you can have both, designed to go together.

This sensational AERO CHAMP is a brand new type of model airplane, practical in design and easy to build. With a wingspan of 46 inches and flying weight of sixteen ounces, it is small, light and sturdy for safe landings. Megow sponge wheels, "Rite-Pitch" propeller and Flight Timer all included with motor, plans and necessary materials for $14.95. Airplane kit only, less motor, wheels and propeller, 95c. Motor only, $12.50. See them at your dealer's, or write direct to us.

New MEGOW "199" MOTOR $12.50

(WITH COIL AND CONDENSER)

Bore and Stroke, ⅝". H.P. 1/7. R.P.M. Max. 10,000. Disp. .199. Weight, 3½ ounces. Block tested.

CYLINDER. Turned from solid chrome Vanadium steel, honed and lapped to .0001". Cadmium plated.

PISTON. Machined and precision-ground from special centrifugal cast iron.

TIMER. Fully enclosed, with special fulcrum type arm and auxiliary spring. Points finest ground and polished tungsten.

CRANKCASE. Special aluminum alloy. Permanently sealed. Extra long special high-speed bronze bearing.

• Motor operated equally well upright or inverted. Visible type gas tank. Oversize fins for efficient cooling. Most efficient coil and condenser obtainable.

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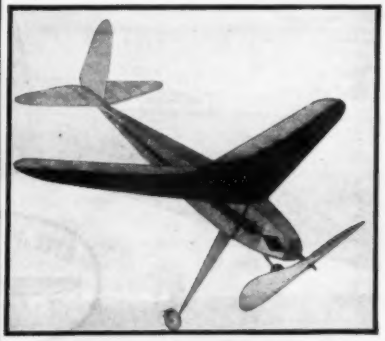
THE ALBATROSS 45 in.

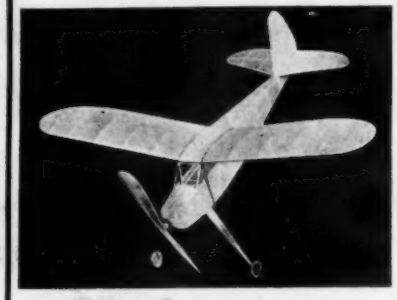
Best time, 2 hours 45 mins., by Ivar Schumaker, Los Angeles.

Towline soaring glider. Here is the large glider you have been asking for. Kit is complete. Add 10c for postage..... **50c**



RECORD WRECKER

Newest Modelcraft Sensation! With a 26" span the Record Wrecker includes freewheeling unit, rubber lube, contest rubber, best quality balsa, cement, dope and large full size plans.
Add 10c for postage..... **50c**



CLOUD HAUNTER

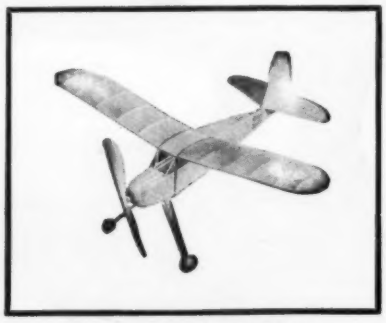
40 in. model, same ship as Pacific Ace, add 10c postage **50c**

W. R. Butterfield of Los Angeles made a flight of 2 hours and 40 min. with his Cloud Haunter.

MODELCRAFT SOARING GLIDER

(Towline Glider)

31½" Soaring Glider has turned in many flights of better than one hour. Kit complete. Add 10c Postage..... **25c**



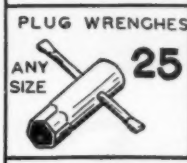
30 in. PACIFIC ACE

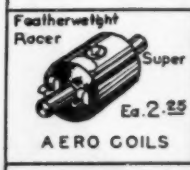
A practical and durable commercial model. Easily constructed from well drawn and detailed plans. Kit contains an ample supply of first grade wood and high quality cement. Comparable with and outflies most dollar kits.
Add 10c for Postage..... **25c**

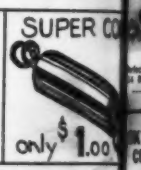
THE CHAMP

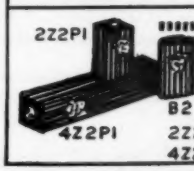
Wing Area 191 sq. in.

It's Making Model History! It will outfly any model in its class. The kit is complete, nothing else necessary to build and fly the model. Includes free wheeling unit, plenty of rubber, rubber lub and the best balsa you've ever seen. Add 10c for postage..... **$1.00**









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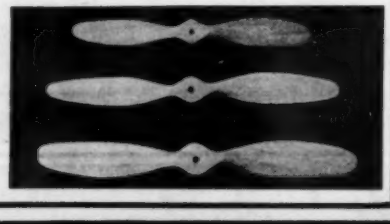
Machine made from straight grain hardwood. Show from 20 to 30% more thrust in every test than any other prop. Put one on your ship and see it climb faster than it ever climbed before. Sold by all dealers and distributors who want to give you the best. Stock up now. Complete range of sizes, 9", 10", 11", 12", 13", 13½", 14", each..... **15¢**



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Gas Model Racing Car. Sleek, powerful looking, aluminum body, cast frame, transverse springs, oilite bearings, special racing wheels, kit..... **$15.00**

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THE LEADING SUPPLY HOUSE OF THE WEST

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OHLSSON "19" Class "A"

.19 Displacement just right for Miss Tiny $14.50

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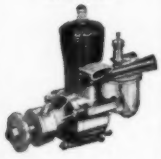

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Bore ½"—Stroke ½" Weight 2 oz. $12.50

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Displacement .49 Bore and Stroke .900 x.950 ..... $12.50

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SPOOK, THE SHIP THAT MAKES AN AVERAGE MODEL BUILDER A POTENTIAL CHAMPION!

SPOOK 48"
CLASS "A" or "B"

You'll Soon Find Out— "NO OTHER SHIP CAN CATCH THE SPOOK!"

The first model that can handle an Ohlsson "60" at full throttle

SPOOK 48 IN. Specifications: Wing span 4 ft.; flying weight with Ohlsson "19", 18 oz. Wing loading 8 oz. per sq. ft. Can be flown as class "B" with Ohlsson "23," Hi-Speed or Brownie. Kit complete with cement, dope, covering and wheels..... **$1.50**

Spook 72 in. To date, test flights have averaged over four minutes each using 19 second run. Wing span 6 ft., flying weight 3 lbs. Power with Brown, Ohlsson "60" or other class "C" engines. (The first model that can handle an Ohlsson "60" at full throttle.) Kit complete with cement, dope, covering and wheels..... **$3.95**

MISS TINY—CLASS "A"

Wing span, 46". **DeLuxe Kit** contains spun cowl, silk, 2½" Voit Air Wheels, cement, dope, die-cut ribs, plenty of good balsa, and full size plans. Price..... **$3.95**

STANDARD KIT same, but with bamboo paper covering..... **$2.95**
DRY KIT complete except for wheels, covering, cement and dope **$1.95**

PLANS ONLY..... **25c**

WHEELER FIELD, HONOLULU, HAWAII June 2nd You Choy Farm and Lin You Farm, won 1st in Class "A" and 2nd in Class "B" with their nifty little Miss Tinys.

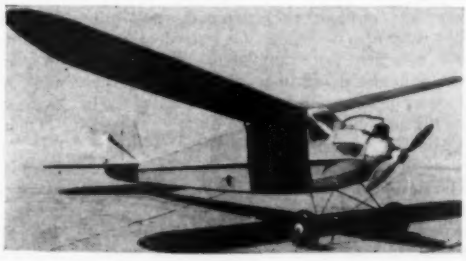
HOW IS THIS FOR "SPOOKEY" PERFORMANCE

POMONA, MAY 5th

Spook 48 in. flown by Jack Muir did 9 minutes and 11 seconds official, chased his model for 1 hour and 30 minutes, recovered 2 weeks later 47 miles from takeoff point. This was Jack's second ship, his first having been lost at Los Angeles, April 21st, after a flight of over 1 hour duration.

LOS ANGELES, MAY 5th

Spook 48 in. flown by Frank Jeffers turned in a flight of 45 minutes and disappeared. Recovered 10 days later.



SKY BABY—CLASS "B"

Designed for Class "B" engine such as Ohlsson 23, Torpedo, Junior Motors Brownie, this model in its test flights did 15 minutes on a 12 second engine run. Has taken many firsts, including the recent Fresno contest. Wing span 54", chord 7". Kit complete with cement, dope, covering, formed landing gear, air wheels, spun aluminum cowl, etc..... **$3.85**

PLANS ONLY..... **25c**

PACIFIC ACE—CLASS "C"

66 in. tapered wing. DE LUXE KIT contains tapered spars, beveled and tapered trailing edge, die-cut ribs, turned aluminum cowl, 1 qt. gas dope, 1 pt. cement, 3½ yds. super silk, formed landing gear, 4½ in. inflatable air wheels, dural wire, alum. tube, washers, bolts, haskalite, dural sheet, hook up wire, switch, selected hard balsa, full sized, black and white, plans with test flight instructions, complete..... **$8.50**

STANDARD KIT with bamboo paper, ½ pt. of dope, 1 pt. of cement and 3½ in. air wheels..... **$6.25**
DRY KIT same as above without cement, dope, silk or wheels **$4.75**

PLANS ONLY..... **50c**

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WOW! LOOK AT THESE NEW LOW PRICES!

AUSTIN-CRAFT again takes the lead in giving you Gas Modelers high quality accessories at prices that will really save you money.

AUSTIN FLIGHT TIMERS
Better than ever..... $1.00

AUSTIN BATTERY BOXES (2 cell type)
Three sizes: penlite, 1" dia.; 1¼" dia., each..... .35

TWIN EXHAUST STACKS for BROWN or MIGHTY MIDGET
Made of polished dural tubing, 5" long..... .60

STACKS FOR OHLSSON "19" and "23" ..... .35

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Light weight, ⅛ oz..... .35

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Replaces prop nut and washer, ¼ oz..... .25

METAL MOTOR MOUNTS
(Large) 3½" by 2½"..... .50
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NEEDLE VALVES. Fits all models of OHLSSON, BROWN AND BUNCH MOTORS. BABY CYCLONE, PHANTOM, HI-SPEED, DENNYMITE, BRAT, TROJAN and many others. Complete unit, only..... .60

FUEL PUMP CANS
Half pint can with pump. For filling tanks or washing dirt off ship or motor..... .60

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(Four sizes). Specify for what type plug ..... .25

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Oil and vibration proof..... .25

VOIT WHEELS
1½" sponge rubber tail wheel .15 ea.
2½" airwheels..... 1.25 pr.
3½" airwheels..... 1.50 pr.
4½" airwheels..... 1.75 pr.

CHAMPION SPARK PLUGS
V, V-2, V-3..... .65 ea.

● **NEW CATALOGUE JUST OUT.** A 2c stamp will bring you your copy. Contains 16 pages full of the latest gas model supplies, accessories, kits and motors. Send for yours today.
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ATTENTION!
BROWN JR. OWNERS

Let us make a new motor of your old worn-out "B" or "D." We can "soup" up your motor to compare in performance to any late type motor of equal displacement. Our complete overhaul service consists of the following: Grinding and honing the cylinder, enlarging the exhaust port, a new cast alloy iron piston fitted and lapped to one ten-thousandth of an inch, new wrist pin, new con. rod machined from strong 17ST dural, crankshaft counterbalanced for smoother running. Returned to you assembled and block-tested in better running condition than a new motor. This service costs you but a fraction of what a new motor of equal performance would.

Send us your old motor with $3.50 in cash or money order and we will have it back to you within 10 days or less.

AUSTIN-CRAFT CO.
431 E. Victory Blvd. Burbank, Calif.

powered model, diving low and clipping the ears off the officials.

From Chicago on July 1, over WMAQ, Ernest Gamasche and Art Vhay of Air Youth of America conducted the last in their present series of coast-to-coast broadcasts. Mr. Gamasche is gathering further information on the necessities of the model game, as well as preparing a series of movies.

In a sensational demonstration of mass flying, the Buzzards Gas Model Club, simultaneously launched 15 identically constructed models with streamers. Bill Lackey, president of the Buzzards, designed the models and supervised their flight. This club is symbolic of a well-organized and conducted group; they fly every Sunday regardless of weather and boast of having the only flying gas model family, the Konefes. Three of their members placed in the gas events; Joe Konefes, 1st Class C Open, Joe Trefny 3rd in the same event and Bill Englehart first in the Class B Open.

Sponsored by the Topeka "Daily Capital" newspaper, and loaded down with models came the Topeka, Kansas, Aero Knatz: Paul Boeger, Pres., Bob Wright, Bill Hinshaw, J. C. Meek, Kenneth Gardner, Harry Robbins, Dan Justice and Kenneth Zima.

Headed by W. Billett and sponsored by the Minneapolis "Star Journal," 15 members of the northern group invaded Chicago and carried off Jr. Class C Gas, and Class B third place. Their ace, J. Chapman, was responsible for this. Bob Toft, last year's Stout trophy winner, was unsuccessful in his attempts to repeat his performance.

One of the most important personalities of the 1940 meet was Mr. Raoul J. Hoffman, Chief Processor. It was he who designed the special processing instruments that speeded up the checking operation. By distributing special cardboard on which cross-sections were drawn and a marked scale built for that purpose, the required areas were rapidly judged. Greatly enlarged slide rules with markings for indoor and outdoor rubber models and gas jobs were also designed. Oversized calipers and 5' rules were available. Each contestant had the privilege of rechecking the measurements with the instruments used by the processors.

Mr. Hoffman has long been the friend of every model builder in Chicago. It was he who designed Col. Roscoe Turners' Thompson Trophy winner several years ago. An expert of many years standing he is frequently consulted on model building problems by the Chicago boys.

Especially to see how things are run in the United States, from Mexico City came Gabriel M. Estrada, Nicholas De Teresa and Louis G. Rodriguez, to view the Nationals. Traveling a distance of 2,600 miles in a Model A Ford, they consulted with Al Lewis, Mr. C. H. Grant and many others. Mr. Estrada extended a most cordial invitation to all model builders to attend one of the Mexico City meets held throughout the summer.

The Victory Banquet was an affair to be long remembered. The contestants were in such fine fettle that it required all of one hour for the master of ceremonies to quell the noise so he could be heard. The excitement was punctuated by exploding "salutes" beneath tables. One would think that after five days of strenuous activities and no sleep, the fans would be more or less subdued. That such was not the case may be unquestionably attributed to the energies of Youth.

The array of "hardware" at the speakers' table was one to strike awe to the stoutest heart. The contestants viewed it in terms of how long it would take to give them out. Before this was done, however, it was necessary to determine the winners, which was done after several hours of hard work on the part of the judges. This time was taken up by entertainment which was provided by the committee in charge; movie stars, magicians and musicians were on hand.

Finally all results were tabulated and the announcement for which everyone was waiting—who would be the 1940 Nationals Champ—was made. He was found to be George Sass Jr. of Detroit, with a high of 200 points. He passed four others who tied for second place honors, among whom was Milt Huguelet, the 1938 winner, with 175 points. George placed second in the Junior Indoor Stick, second in the Mulvihill and third in the Indoor Cabin Events. It was his joy also to put across the points to bring the Detroit Jr. AMA Chapter the Megow Club Trophy. This club put up a remarkable performance under the leadership of Steve Corbett. Last year this trophy was taken from the Detroit group by the Chicago boys. It was ironical that the Detroit Boys should win it back from the Chicago boys, but the Detroiters came to Chicago with "fire in their eyes" for this special purpose. Great excitement prevailed at the banquet when it was announced that they had won the trophy. A great deal of the credit for winning this should go to Steve Corbett and Mr. McKay, his assistant.

After this announcement Frank Nekimken continued the presentation of the trophies and awards; requiring about four hours to complete this function. If national contests become any larger we wonder how the thousands of details necessary for such an event can be arranged in orderly fashion and where the time can be found to "squeeze" in all of the events required.

One of the great benefits derived from this annual contest is the reunion of old friends among the model builders and manufacturers. The Nationals have become a get-together for model enthusiasts from all over the country and serves as a dominant factor in creating friendship and the spirit of cooperation among everyone. Model builders advance their technique by an interchange of ideas and dealers and manufacturers promote more friendly feeling toward one another by intimate personal talks and understanding of one another's problems.

Everyone now is looking forward to the 1941 Nationals and hoping it will be as fine as 1940.

Our congratulations are extended to all those responsible for this great convention.

Next month MODEL AIRPLANE NEWS will present further interesting features of the Nationals. Now we present the list of winners in all events:

TIGER

Better NOT Bigger!

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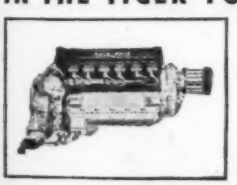
TIGER SERIES *ENGINES*

ADD POWER NOT WEIGHT TO MEET THE NEW RULES AND WIN CONTESTS

In the "hot bed" of competition more Tigers are top winners than all other motors. Actual results of Southern California Championship Meet at Los Angeles, June, 1940, show Tiger motors win 5 out of first 14 places—more than any other single motor. Central California Championship at Fresno 1940, 1st and 2nd place winners fly with Bunch motors. Northern California Championship, Modesto 1940, 1st place a Bunch winner.

IN THE TIGER YOU WILL FIND



Power that counts. The Tiger Aero produces a higher horsepower per unit of displacement than any type gasoline engine. Today's pursuit fighters of over 400 M.P.H. have less than one horsepower per cubic inch engine displacement. The Tiger produces 97% of one horsepower per cubic inch ratio.

The Tiger gains performance through a porting system surrounding the cylinder 360 degrees.

See the Tiger at dealers packed in this winged cartop or send 20c for technical information.

WHY THIS WINNING PERFORMANCE?

New performance figures for the Tiger show 44/100 horespower or 4½ pounds thrust at 8500 R.P.M. With all this power at 45/100 of a cubic inch displacement your total model weight required is only 36 oz. Consider these facts in relation to the plane you fly. Switch to the winning engine with the double-compression feature—piston rings plus lapped in piston.

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MAIL THIS COUPON for your catalogue with 20c in coin or stamps. Your 20c will be refunded on purchase of any one of the seven engines presented.

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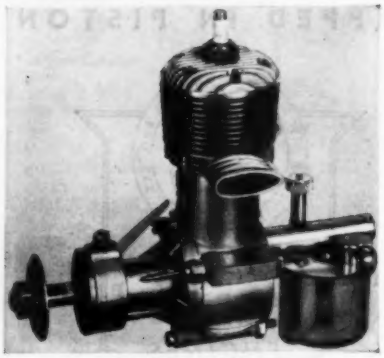
FORSTER "29"



.2v7 inch—1/5 H.P.—$15.50 complete

it's ahead in

DESIGN, POWER, SAFETY *and* VALUE

Equipped with the latest type rotary valve, hardened and individually lapped steel piston, new high turbulance combustion chamber, internal streamlining, and the new exclusive "clutch propeller lock," it is setting new standards of performance! The crankshaft is fully counter-balanced and hardened, the timing cam and tubular wrist pin are also hardened. High speed bearings, a new "snap" piston pin lock and other new features set it apart from ordinary motors.

Standard beam and radial mounts! It lends itself exceptionally well for inverted mounting, making perfect cowling easy. No bearing trouble—no extras to buy!

FOR QUALITY AND DEPENDABILITY, LOOK TO FORSTER

Write today for Folder "B"

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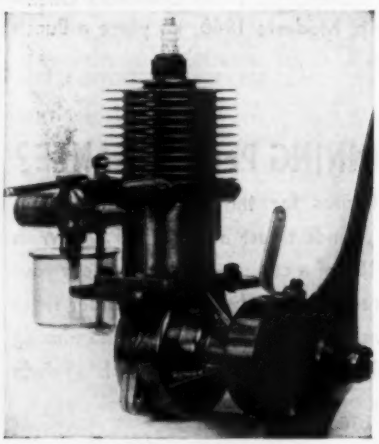
For "C" class contest planes and Radio Controlled planes, consider the many advantages of the FORSTER

SUPER "99"



.997 inch—½ H.P.—$20.75 complete

The MOTOR of CHAMPIONS!

Sal Taibi's sensational seven-foot span "Hornet" of which outstanding performances you've read about in Model Airplane News, is powered by the "Super-99," the motor that offers you a throttle control carburetor, ball bearing crankshaft, exceptional easy starting, reliability, and long life, plus ½ H.P.

No more changing of spark lever or gas adjustment to vary the speed! The throttle alone does it, your radio mechanism can operate it.

THIS MOTOR WON FIRST AND THIRD PLACES AT THE MEXICAN NATIONALS, MEXICO CITY, JUNE 16, 1940.

Write today for Folder "C"

FORSTER BROTHERS

519 Lake Street, Maywood, Illinois

RESULTS OF THE 1940 NATIONAL MODEL AIRPLANE CHAMPIONSHIPS

CHICAGO, ILLINOIS—July 1-6, 1940

SPONSORED BY THE CHICAGO PARK DISTRICT AND THE "DAILY TIMES"

Sanctioned by the National Aeronautic Association. Conducted under the supervision and regulations of the Academy of Model Aeronautics.

Contest Director	Frank Nekimken, Chicago Park District
Meet Manager	S. J. Meuris, Chicago Park District
Treasurer	Maurice Roddy, Chicago Daily Times
Secretary	F. E. Kardes, Chicago Park District
Director of Model Aircraft Exposition	John Russo, International Amphitheater
Chief Processor	Raoul J. Hoffman, Aero. Engineer
Chief Field Operations	John Rappold, Chicago Park District
Chief Recorder	Herbert Bart, Chicago Park District

MEGOW CLUB TEAM TROPHY

Detroit Jr. N. A. A. Chapter	120 Points
Kresge Aero Club, Newark, New Jersey	85 Points
Jordan-Traveler Junior Aviation League, Boston	64 Points

NATIONAL CHAMPION

1.	George Sass, Jr.	Detroit, Mich.	200.		National Exchange Club Perpetual Trophy
2.	Gordon Cain	Boston, Mass.	175.		Chicago Exchange Club Elgin Watch Award and $50.00 Cash from Meet Sponsors
2.	Milton Huguelet	Chicago, Ill.	175.		
2.	Henry Struck	New York, N. Y.	175.		
3.	Roman Jagiello	Chicago, Ill.	175.		
4.	Chester Lanzo	Cleveland, Ohio	160.		
5.	J. Cahill	Indianapolis, Ind.	150.		
5.	Henry Kaczynski	Detroit, Mich.	150.		

OUTDOOR FLYING SCALE MODEL CONTEST

OPEN

1.	Edward Naudzius	Detroit, Mich.	87.	Thos. Bourne Joy Memorial Trophy and Miniature and $25
2.	Henry Struck	New York, N. Y.	74.64	Park District—Times Trophy and $20
3.	Chester Lanzo	Cleveland, Ohio	61.51	$15
4.	John Ogilvie	New York, N. Y.	61.22	$10
5.	Edward Petkus	Cicero, Ill.	37.78	$5
6.	Harry Dolph	Chicago, Ill.	30.45	Medal
7.	Michael Soroka	Cleveland, Ohio	27.37	Medal
8.	Mickey Beitchman	Brooklyn, N. Y.	26.40	Medal

SENIOR

1.	Rancel D. Hill	Akron, Ohio	67.0	Comet Model Trophy
2.	Walter Eggert	Philadelphia, Pa.	65.50	Pk. Dist.-Times Trophy
3.	Raymond Baumont	Philadelphia, Pa.	58.36	Megow Voucher
4.	Chester Stasik	Pittsburgh, Pa.	50.06	Megow Award
5.	Robert Abrahamson	Boston, Mass.	49.79	Medal
6.	Anthony Kazlouskas	Akron, Ohio	44.63	Medal
7.	Gregory Kohn	Milwaukee, Wis.	36.82	Medal
8.	M. Schoenbrun	Brooklyn, N. Y.	36.15	Medal
9.	W. T. Judd, Jr.	Detroit, Mich.	32.17	Medal
10.	George Driskoll	Staten Island, N. Y.	32.14	Medal

JUNIOR

1.	Al DeBuschere	Detroit, Mich.	55.	United Airlines Trophy

BERRYLOID FINISH CONTEST

Best Finished Gas Model—Berryloid Gold Trophy
Henry Heymann, Jr.—New Orleans, La.
Best Finished Flying Scale Model—Berryloid Gold Trophy
James Noonan—Milwaukee, Wis.

RADIO CONTROL EVENT

Walter Good	65 points	Ed Robert Trophy, $100
C. H. Siegfried	49 points	$50
Joe Raspante	34 points	$25 Cash
James Custin	23 points	$25 Cash
Ben Shereshaw	19 points	$25 Cash
John Ault	17 points	Battery Award
Phillip Sonheim	13 points	Battery Award
Elmer Wasman	12 points	Battery Award
Lester Helle	11 points	15 General Radio Batteries
Jesse Bieberman	10 points	M & M Large Air Wheels
Robert Reder	6 points	General Battery Award

MOFFETT FINALS

Name	*Country*	*Proxy*	
R. Nelder	Canada		289.6
Alexander	New Zealand		231.33
F. Prokop	U. S. A.		224.9
R. Copeland	Great Britain	Frank Zaic	206.66
T. Just	U. S. A.		189.33
C. Fairfield	Canada		141.7
Righton	New Zealand		134.6
R. Kirk	U. S. A.		106.733
J. Boyle	U. S. A.		94.0
Benoni	South Africa	Joe Matulis	86.033
Leong	New Zealand	Ed Lidgard	77.3
Ricketts	New Zealand		73.466
C. C. Johnson	U. S. A.		68.133
Bob Reich	U. S. A.		53.0
Truman	New Zealand		39.766
R. Smith	Canada		23.6

MOFFETT ELIMINATIONS

JUNIORS

Hilton Mollenhauer	San Antonio, Tex.	727.3		Chicago Jr. Ass'n. of Commerce Flying Club Trophy.
James Kahremanis	Romulus, Mich.	572.3		Park District-Times Trophy
Walter Savikas	Chicago, Ill.	495.2		Comet Sailplane
Charles Jackson	Chicago, Ill.	493.9		Medal
Dick Hartley	Chicago, Ill.	437.9		Medal
Harry Robbins	Topeka, Kan.	434.7		Medal
Calvin Beggs	Chicago, Ill.	396.4		Medal
George Sass, Jr.	Detroit, Mich.	354.5		Medal
Benjamin Bakerjian	Watertown, Mass.	350.2		Medal
Joe Chizmadia	Detroit, Mich.	293.8		Medal
Albert Blatter	Detroit, Mich.	291.8		Medal
Joe Bashote	Wyandotte, Mich.	267.6		Medal
Robert Kaufmann, Jr.	Barberton, Ohio	254.5		Medal
Jerry Hale	Kalamazoo, Mich.	242.5		Medal
Frederick A. West, Jr.	Milwaukee, Wis.	227.4		

BIGGEST NEWS FOR MODEL BUILDERS

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TESTOR CEMENT CO., *"The House of Adhesives"*, ROCKFORD, ILL.

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"G" LINE FLYING

Sensational - New - Thrilling

GAS POWERED SUPER SPEED PLANES FLOWN UNDER FULL CONTROL

NOT RADIO CONTROLLED

Protected By Patent Pend.

TIGER SHARK
SPEED DEMON

DELUXE
$4.95
KIT
COMPLETE

The Super Streamlined TIGER SHARK, "G" Line Speed Plane, roars through the air at the unbelievable speed of from 50 to 75 M.P.H. Due to the inherent "G" Line Flying Stability, engineered into this design, the Shark is unusually stable and easy to control. May be powered with any 1/7 or 1/5 H.P. Motor.

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Wing Span 36"—Class A Flying Boat

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Price, postpaid less motor $2.95

Burkard Model Eng. Co.
2K East Ave., Larchmont, N. Y.

MOFFETT ELIMINATIONS
SENIORS

1.	Caldwell C. Johnson	Hampton, Va.	1,302.1	Stout Perpetual Trophy, Times Trophy
2.	Ronald Kirk	St. Paul, Minn.	1,042.6	Park District-Times Trophy
3.	Frank Prokop	Detroit, Mich.	724.2	Cleveland Award
4.	Ted Just	Johnstown, Pa.	681.3	Scientific Award
5.	Wilfred Bobier	Detroit, Mich.	667.7	Cleveland Award
6.	James Broderick	Chicago, Ill.	653.3	Medal
7.	Walter Fromm	Chicago, Ill.	609.3	Medal
8.	Jack Minassian	Astoria, L. I., N. Y.	589.4	Medal
9.	Rev. W. Beaumont	Philadelphia, Pa.	575.6	Medal
10.	George Greich	Cleveland, Ohio	565.1	Medal
11.	Allen Dean	Detroit, Mich.	559.9	Medal
12.	Kenneth Crandell	Wichita, Kan.	552.2	Medal
13.	David Palmer	Kalamazoo, Mich.	549.4	Medal
14.	Robert Annas	Detroit, Mich.	515.9	Medal
15.	Bob Romeiser	Indianapolis, Ind.	511.3	Medal

MOFFETT ELIMINATIONS
OPEN CLASS

1.	Robert Reich	Cleveland, Ohio	834.1	Burgess Battery Trophy
2.	Joseph V. Boyle	Coraopolis, Pa.	688.9	Park District—Times Trophy
3.	Arnold Zimmerman	Cedar Rapids, Ia.	558.	Megow Award
4.	Gerald Sanderson	Chicago, Ill.	551.5	Scientific Award
5.	Mike Soroka	Cleveland, Ohio	532.1	Cleveland Award
6.	Chester D. Lanzo	Cleveland, Ohio	527.1	Medal
7.	Edward Naudzius	Detroit, Mich.	526.3	Medal
8.	John Ogilvie	New York, N. Y.	520.4	Medal
9.	John Drobshoff	San Francisco, Cal.	520.1	Medal
10.	Leo T. Bailey	Akron, Ohio	518.8	Medal
11.	Henry Struck	Long Island, N. Y.	500.8	Medal
12.	Ray Berens	Chicago, Ill.	492.2	Medal
13.	James Noonan	Milwaukee, Wis.	487.8	Medal
14.	Dick Korda	Cleveland, Ohio	480.2	Medal
15.	Ervin Leshner	Philadelphia, Pa.	478.6	Medal

CLASS "A" GAS EVENT—JUNIORS

R.	Lieber	Philadelphia, Pa.	383.8	Champion Spark Plug Trophy
M.	A. Bristol	Oak Park, Ill.	261.8	Park District-Times Trophy and Elf Engine
W.	J. Levedahl	Aurora, Ill.	216.3	Megow Voucher
J.	Brofman	Brooklyn, N. Y.	188.7	½ Dozen General Batteries
S.	Callaway	Miami, Fla.	186.5	Medal
A.	E. Cloyd, Jd.	Lexington, Ky.	105.7	Medal
Edward	Crook	Chicago, Ill.	62.2	Medal
C.	Lauritsen	Lincoln, Nebr.	52.	Medal

CLASS "A" GAS EVENT—SENIORS

L.	Shulman	Newark, N. J.	1,196.3	Comet Perpetual Trophy and Ohlsson "60" and Miniature
P.	Fruchtman	Brooklyn, N. Y.	1,142.	Ritz Propeller Clock
R.	C. Hartman	Norwood, Ohio	878.1	½ Dozen General Batteries
C.	C. Johnson	Hampton, Ga.	581.8	M & M Air Wheels
J.	Stoloff	New York, N. Y.	489.9	Medal
H.	Thompson	Peoria, Ill.	474.8	Medal
B.	Heller	Chicago, Ill.	460.6	Medal
F.	Emmert	Minneapolis, Minn.	393.3	Medal
B.	Penksaw	Chicago, Ill.	376.2	Medal
S.	Taibi	Brooklyn, N. Y.	364.3	Medal

CLASS "A" GAS EVENT—OPEN

W.	Gibson	Middleton, Ohio	2,852.	Modelcraft Perpetual Trophy and Miniature and Ohlsson "60"
F.	Drobshoff	San Francisco, Cal.	1,975.2	Air Trails Trophy
J.	Conway	Evanston, Ill.	932.6	Ritz Propeller Clock
R.	Gable	Reading, Pa.	820.9	Dozen General Batteries
R.	Mitchell	Cleveland, Ohio	761.	½ Dozen General Batteries
W.	Schwab	Cleveland, Ohio	718.7	M & M Air Wheels
E.	Manning	Detroit, Mich.	650.4	Medal
J.	Ryczas	Cleveland, Ohio	626.	Medal
J.	Findra	New Brunswick, N. J.	605.	Medal
L.	Garami	Woodside, L. I.	601.1	Medal

CLASS "B" GAS EVENT—JUNIOR

1.	L. E. Maze, Jr.	St. Louis, Mo.	902.2	Chicago, Pk. Dist.-Times Trophy
2.	Dick Lyons, Jr.	Libertyville, Ill.	551.8	Branniff Airways Trophy
3.	J. Chapman	Minneapolis, Minn.	410.4	Wright Aero. Award
4.	B. A. Miller	Holt, Mich.	408.8	½ Dozen General Batteries
5.	J. Bock	Chicago, Ill.	370.8	Medal
6.	Charles Smith	Ft. Wayne, Ind.	347.6	Medal
7.	R. Halboth	Detroit, Mich.	332.1	Medal
8.	M. A. Bristol	Oak Park, Ill.	301.	Medal
9.	Charles G. Ray, Jr.	Ames, Ia.	294.4	Medal
10.	Deane Tubbs	Chicago, Ill.	263.9	Medal

CLASS "B" GAS EVENT—SENIOR

1.	Bill Redeker	Cincinnati, Ohio	1,680.8	$25 Ohlsson Rice Trophy and Ohlsson "19"
2.	D. Wright	Topeka, Kan.	1,194.1	$15—Model Craftsman Trophy
3.	Leon Shulman	Newark, N. J.	1,150.4	$10—Park District-Times Trophy
4.	Dushon Deshick	Chicago, Ill.	1,088.8	$5—Megow Voucher
5.	Jacob Drake	Franklin, Mich.	1,017.6	General Battery Award
6.	Ken H. Lane	Milwaukee, Wis.	973.1	M & M Airwheels
7.	L. Harmon		919.7	Medal
8.	Paul Schroeder	Rochester, N. Y.	870.8	Medal
9.	Don Redding	Ft. Wayne, Ind.	868.8	Medal
10.	John Ditch	St. Louis, Mo.	846.9	Medal

CLASS "B" GAS EVENT—OPEN

1.	W. H. Engelhardt	Chicago, Ill.	1,220.5	Gar Wood Perpetual and Ohlsson "19" Trophy and Miniature
2.	William B. Schwab	Cleveland, Ohio	818.6	Ritz Mfg. Co. Propeller Clock
3.	C. Keeling	Louisville, Ky.	724.5	Park District-Times Trophy
4.	J. S. Fedora	Granite City, Ill.	709.6	American Airline Award
5.	H. Benson	Rock Island, Ill.	704.0	General Battery Award
6.	John D. Conway	Evanston, Ill.	661.6	M & M Airwheels
7.	Alvin Anderson	Chicago, Ill.	593.1	Medal
8.	J. R. Robinson	Nashville, Tenn.	586.1	Medal
9.	J. Mastovitch	Fords, N. J.	585.4	Medal
10.	E. E. Buehler	New Philadelphia, Pa.	580.5	Medal

CLASS "C" GAS EVENT—JUNIORS

1.	J. Bashore	Wyandotte, Mich.	1,468.0	Forster Trophy—Syncro B-50 Motor
2.	B. Hinshaw	Topeka, Kan.	1,158.0	Bess Kobernus Trophy
3.	C. Boughter, Jr.	Geneva, N. Y.	969.6	Megow Award
4.	J. Chapman	Minneapolis, Minn.	655.2	General Battery Award
5.	J. R. Conlin	Madison, Wis.	532.0	M & M Air Wheels

More New MEGOW Models

GULFHAWK Jr. $1.50

RYAN ST. $1.50

AIRACOBRA $1.00

COMPLETE with MOTOR

Aero Champ Gas Model $14.95

(Including Motor, "Rite-Pitch" Propeller, Megow Sponge Wheels, Flight Timer and Kit)

A new type of gas-powered model airplane, with a wingspan of 46 in. and total flying weight of only 16 ounces. Complete with all necessary plans and materials.

Aero-Champ Model Airplane Kit, less motor, wheels, propeller and flight timer **95c**
(Postage, 20c extra)

New MEGOW "199" MOTOR with Coil and Condenser $12.50

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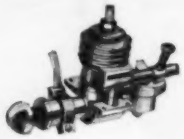

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The Outstanding Engine Building Triumph of 1940

Specifications

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Stroke 9/16"	Weight 5½ oz.
Displacement .292	May be inverted
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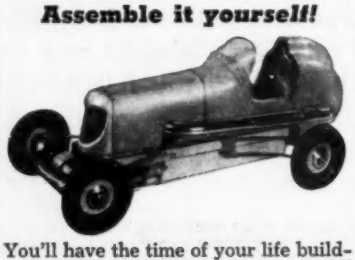

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6.	L. Maxe	St. Louis, Mo.	472.9	Medal
7.	S. Callaway	Miami, Fla.	416.0	Medal
8.	Chase	Granite City, Ill.	275.6	Medal
9.	R. Graebner	Bay City, Mich.	269.5	Medal

CLASS "C" GAS EVENT—SENIORS

J.	Leiendecker	Ft. Wayne, Ind.	1,825.0	Wheat Memorial Trophy, $100
Jules	Carrett	Chicago, Ill.	1,351.3	Wheat Trophy, $75
R.	Abresch	Milwaukee, Wis.	1,329.0	Wheat Trophy, $50
J.	Loufek	Davenport, Ia.	1,278.1	$25
Bill	Blair	Pittsburgh, Pa.	1,161.2	Comet Award—Sailplane
R. J.	Zellner	Green Bay, Wis.	904.6	General Battery Award
D.	Allen	Detroit, Mich.	853.0	Cleveland Award
R.	Sargent	Atlanta, Ga.	833.5	Medal
W.	Otto	Chicago, Ill.	752.0	Medal
R.	Storbeck	Kankakee, Ill.	725.9	Medal
L. R.	Herscher	Kankakee, Ill.	696.5	Medal
G. S.	Parker	Madison, Wis.	677.3	Medal
H. G.	Melin	Galesburg, Ill.	652.1	Medal
Al	Naragon	Waterloo, N. Y.	648.7	Medal
H.	Heckendorf	Chicago, Ill.	621.8	Medal
B.	Redeker	Cincinnati, Ohio	615.9	Medal
Ed	Konefes	Chicago, Ill.	614.3	Medal
G.	Paxon	Salem, Ohio	560.6	Medal
H.	Lance	Dearborn, Mich.	557.1	Medal
E.	Tschernoscha	Milwaukee, Wis.	552.6	Medal
D.	Redding	Ft. Wayne, Ind.	524.6	Medal
L.	Ginestra	Rockford, Ill.	517.8	Medal
C.	Fairfield	Toronto, Canada	517.5	Medal
F.	Davidson, Jr.	Lorain, Ohio	500.0	Medal
H.	Rhodes	Alliance, Ohio	479.9	Medal

CLASS "C" GAS EVENT—OPEN

1.	J. Konefes	Chicago, Ill.	3,475.6		Model Airplane News Trophy—Ohlsson "23" Motor
2.	S. Hackenberg	Kansas City, Mo.	2,106.6		Guillow Trophy—Syncro B-30 Motor
3.	J. Trefny, Jr.	Villa Park, Ill.	1,721.3		Syncro Saw-American Airlines Award
4.	W. J. Addams	Riverside, Ill.	1,411.6		Wright Aero Award
5.	W. Lackey	Maywood, Ill.	1,325.3		Burgess Battery Award
6.	W. Schwab	Cleveland, Ohio	1,194.4		Medal
7.	R. Klein	Berwyn, Ill.	1,187.9		Medal
8.	H. P. Andrews	Rock Island, Ill.	1,163.8		Medal
9.	H. Struck	Jackson Heights, L. I.	1,100.3		Medal
10.	M. H. Yates	Joliet, Ill.	1,051.2		Medal
11.	M. Ellis	Rochester, Minn.	1,022.31		Medal
12.	A. C. Warne	Beloit, Wis.	952.3		Medal
13.	P. Collins	Cleveland, Ohio	910.8		Medal
14.	W. Bristow	Detroit, Mich.	903.8		Medal
15.	P. Boeger	Topeka, Kan.	886.9		Medal
16.	J. A. Dellaire	Detroit, Mich.	876.0		Medal
17.	F. Plachy	Chicago, Ill.	870.1		Medal
18.	J. C. Eberle	Pittsburgh, Pa.	789.3		Medal
19.	K. Girten	Milwaukee, Wis.	770.0		Medal
20.	M. Snyder	Dayton, Ohio	696.9		Medal
21.	G. Meyer	St. Louis, Mo.	692.2		Medal
22.	A. E. Anderson	Chicago, Ill.	687.7		Medal
23.	G. Greiner	Chicago, Ill.	668.7		Medal
24.	R. Podolsky	St. Louis, Mo.	584.3		Medal
25.	W. Good	Kalamazoo, Mich.	546.5		Medal

INDOOR CABIN EVENT—JUNIORS

1.	H. Kaczynski	Detroit, Mich.	762.3		Jack Vilas Trophy
2.	R. Jagiello	Chicago, Ill.	692.3		Park District—Times Trophy—Syncro B-30 Motor
3.	G. Sass, Jr.	Detroit, Mich.	676.5		Scientific Award
4.	J. Kahremenis	Romulus, Mich.	516.1		Scientific Award
5.	A. Blatter	Detroit, Mich.	389.5		Medal
6.	B. Bakerjian	Watertown, Mass.	371.9		Medal
7.	C. Czyryk	Chicago, Ill.	342.		Medal
8.	O. Curth	Chicago, Ill.	280.9		Medal
9.	A. Debusschere	Detroit, Mich.	232.		Medal
10.	C. Beggs	Chicago, Ill.	129.2		Medal
11.	J. Chizmadia	Detroit, Mich.	126.5		Medal
12.	E. Raka	Detroit, Mich.	47.3		Medal

INDOOR CABIN EVENT—SENIORS

1.	G. Cain	Hyde Park, Mass.	953.		Bloomingdale Trophy and Miniature—Times Gold Trophy
2.	M. Huguelet	Chicago, Ill.	831.		Park District — Times — Comet Award and Elf Engine
3.	H. Lerman	Malden, Mass.	810.3		Megow Award
4.	W. Bobier	Detroit, Mich.	784.3		Medal
5.	S. W. Stanwick	East Cambridge, Mass.	759.5		Medal
6.	W. Hartung	Detroit, Mich.	719.3		Medal
7.	T. Just	Johnstown, Pa.	681.5		Medal
8.	Irving Kovnat	Chicago, Ill.	676.5		Medal
9.	P. Mallione	East Hartford, Conn.	637.7		Medal
10.	G. A. Johnson	Minneapolis, Minn.	628.2		Medal
11.	H. R. Velkoff	Ft. Wayne, Ind.	627.6		Medal
12.	R. Brown	Arlington, Mass.	624.4		Medal
13.	D. Hannon	East Boston, Mass.	548.7		Medal
14.	G. Lambros	St. Louis, Mo.	468.3		Medal
15.	C. R. Plegge	St. Louis, Mo.	462.5		Medal

INDOOR CABIN EVENT—OPEN

1.	E. Leshner	Philadelphia, Pa.	933.6		Burgess Battery Trophy
2.	J. B. Cahill	Indianapolis, Ind.	853.6		Whitfield Paper Co. Trophy
3.	C. Werle	San Francisco, Cal.	828.6		Park District—Times Trophy—Comet Award
4.	J. P. Matulis	Chicago, Ill.	823.1		Megow Voucher
5.	C. D. Janke	Sheboygan, Wis.	762.		Medal
6.	Herbert Greenberg	Hartford, Conn.	746.2		Medal
7.	R. G. Schmidt, Jr.	Chicago, Ill.	744.3		Medal
8.	R. W. Obarski	Chicago, Ill.	688.8		Medal
9.	S. Wallerstein	Boston, Mass.	652.2		Medal
10.	W. E. Gough, Jr.	Chicago, Ill.	635.2		Medal
11.	R. J. Cahill	Highland Park, Mich.	634.1		Medal
12.	M. S. Andrews	Philadelphia, Pa.	589.1		Medal
13.	H. Struck	Jackson Heights, L. I.	580.6		Medal
14.	W. March	Chicago, Ill.	580.6		Medal
15.	P. Ford	Columbus, Ohio	534.7		Medal

JUNIOR INDOOR STICK

1.	R. Jagiello	Chicago, Ill.	1,157.3		Stout Trophy and Early Birds Trophy
2.	G. Sass, Jr.	Detroit, Mich.	880.0		Syncro Saw

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This is no "sissy" airplane. A real ship packed with thrills, excitement, and performance. Designed for model builders who want action in the air. A robust giant built with the famous "BUCCANEER" super strong construction. It packs performance. After a take off run of 100 feet, it picks up speed of 70 m.p.h., then up points the nose and you watch the "Special" become a pin-point in the sky.

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SPECIFICATIONS:

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$6.95 p.p.
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NEW! Super Dooling.....$24.50 p.p.

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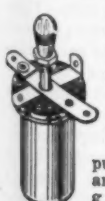
New Dooling	$5.00 set of four
New Voit	$6.00 set of four
New Champion V1 Racing Plug	65c
Electrion Oil, 3 oz. can	25c

"TIME-AIR"



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America's biggest model value. The flashiest big model you ever saw. The latest ship of the famous Rearwin Aircraft Co. Compare this kit with anything on the market. BERKELEY quality materials used throughout and you just can't better this value anywhere.

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4.	J. Kahremanis	Romulus, Mich.	706.0	American Airlines Award
5.	C. Beggs	Chicago, Ill.	683.3	Medal
6.	O. Kurth	Chicago, Ill.	661.8	Medal
7.	B. Bakerjian	Watertown, Mass.	637.2	Medal
8.	J. Wilemski	Detroit, Mich.	586.0	Medal
9.	J. Chizmadia	Detroit, Mich.	383.7	Medal
10.	A. Blatter	Detroit, Mich.	273.7	Medal
11.	A. Debusschere	Detroit, Mich.	136.0	Medal

SENIOR INDOOR STICK

M.	Huguelet	Chicago, Ill.	1,102.3	Park District—Times Trophy
G.	Cain	Hyde Park, Mass.	1,098.8	Park District—Times Trophy
A.	Adler	Philadelphia, Pa.	1,049.3	Wright Aero Award
R.	Bancroft	Detroit, Mich.	1,036.4	American Airlines Award
A.	Beckington	Rockford, Ill.	984.5	Medal
R.	Brown	Arlington, Mass.	945.7	Medal
S.	Stanwick	East Cambridge, Mass.	945.1	Medal
J.	Minassian	Astoria, N. Y.	933.3	Medal
M.	Nemirofsky	Philadelphia, Pa.	893.4	Medal
A.	Rohrbaugh	New Haven, Ind.	880.7	Medal
D.	Call	Philadelphia, Pa.	851.7	Medal
H.	Lerman	Malden, Mass.	844.3	Medal
R.	DeBatty	Chicago, Ill.	829.2	Medal
S.	Bennett	Oakland, Cal.	803.0	Medal
A.	Kazlouskas	Akron, Ohio	799.5	Medal

OPEN INDOOR STICK

W.	March	Chicago, Ill.	1,052.9	Flying Aces Trophy—Springfield Perpetual Trophy
J.	Cahill	Indianapolis, Ind.	1,007.1	Syncro B-30 Motor Comet Award
H.	Struck	Jackson Heights, N. Y.	984.9	Wright Aero Award
J.	Matulis	Chicago, Ill.	974.8	American Airlines Award
C.	Werle	San Francisco, Cal.	969.5	Cleveland Award
C.	Janke	Sheboygan, Wis.	941.4	Medal
J.	Ogilvie	New York, N. Y.	938.1	Medal
M.	Andrews	Philadelphia, Pa.	928.1	Medal
W.	Gough	Chicago, Ill.	885.2	Medal
R.	Obarski	Chicago, Ill.	882.7	Medal
R.	Schmitt, Jr.	Chicago, Ill.	823.5	Medal
J.	Kovel	Brooklyn, N. Y.	810.4	Medal
T.	Capo	Quincy, N. Y.	810.1	Medal
E.	Leshner	Philadelphia, Pa.	793.8	Medal
H.	Greenberg	Hartford, Conn.	782.1	Medal
J.	Schneider	Scotia, N. Y.	729.7	

MULVIHILL OUTDOOR STICK—JUNIORS

1.	L. Vargo	Chicago, Ill.	904.2	Illinois Air Pilots Association Trophy
2.	George Sass, Jr.	Detroit, Mich.	676.9	Park District—Times Trophy
3.	R. Kaufmann, Jr.	Barberton, Ohio	658.4	Megow Award
4.	J. Block	Hartford, Conn.	637.5	Medal
5.	A. Blatter	Detroit, Mich.	549.9	Medal
6.	Jack Gould	Chicago, Ill.	484.3	Medal
7.	H. Mollenhauer	San Antonio, Tex.	437.	Medal
8.	Henry Kaczynski	Detroit, Mich.	435.5	Medal
9.	C. Beggs	Chicago, Ill.	433.	Medal
10.	Albert DeBusschere	Detroit, Mich.	414.1	Medal

MULVIHILL OUTDOOR STICK—SENIORS

1.	Homer Heller	Detroit, Mich.	1,217.5	John Russo Trophy—Mulvihill Trophy
2.	B. Walfston	Birmingham, Mich.	1,107.	Kesl Co. Trophy
3.	Bob Romeiser	Indianapolis, Ind.	1,098.5	Park District—Times Trophy
4.	Robert Armas	Detroit, Mich.	1,068.3	Scientific Award
5.	Ralph Brown	Arlington, Mass.	1,037.7	Cleveland Award
6.	Paul Hunter	Cleveland, Ohio	984.3	Medal
7.	R. Kumferman	Milwaukee, Wis.	972.1	Medal
8.	Morris Huff	Milwaukee, Wis.	945.3	Medal
9.	C. W. Brown	Chicago, Ill.	926.9	Medal
10.	R. Weeks	Detroit, Mich.	925.8	Medal

MULVIHILL OUTDOOR STICK—OPEN

1.	Chester D. Lanzo	Cleveland, Ohio	2,667.5	Air Trails Watch Award
2.	Wallace Simmers	Chicago, Ill.	1,201.1	Berkley Trophy
3.	Henry Struck	Jackson Heights, L. I., N. Y.	1,179.5	Scientific Award
4.	L. Petraitis	Akron, Ohio	1,110.4	Cleveland Award
5.	J. Vermoch	Chicago, Ill.	930.9	Medal
6.	D. Korda	Cleveland, Ohio	700.8	Medal
7.	Ervin Leshner	Philadelphia, Pa.	684.1	Medal
8.	L. T. Bailey	Akron, Ohio	670.2	Medal
9.	Robert G. Gable	Reading, Pa.	669.8	Medal
10.	Robert Reed	Mattoon, Ill.	626.9	Medal

The Physics of the Airplane

(Continued from page 28)

sound is determined primarily by the intensity of the vibrations transmitted to the ear. This, in turn, can be said to be dependent upon the energy exerted by the vibrating body which is the cause of the original disturbance. Thus, we can simply say that the loudness or intensity of a sound increases with the amplitude of vibration of the medium.

It becomes quite possible for sounds to have the same intensity and pitch and yet our ear may have a very different effect produced upon it by each of them. This distinction is expressed by the term quality or timbre. The above conditions prevail because of the various complexities in the vibrations of the origin of the disturbance causing these sounds. In addition to the fundamental vibrations imposed on this medium, there may be present tones of a higher pitch, the frequencies of which are simple multiples of that of the fundamental or lowest tone. These frequencies are termed harmonics or overtones. For instance, the first overtone is also the second harmonic and has a frequency of twice the value of that of the fundamental.

Sound devices occupy an important position in the science of aeronautics. Radio telegraph and radio telephone apparatus both enjoy wide usage in military aircraft as well as transport airplanes. Treatment, however, is reserved for these accessories in the later chapters which deal with electricity and magnetism. Military forces of all countries employ devices which detect the positions of hostile aircraft by means of the sounds emitted by

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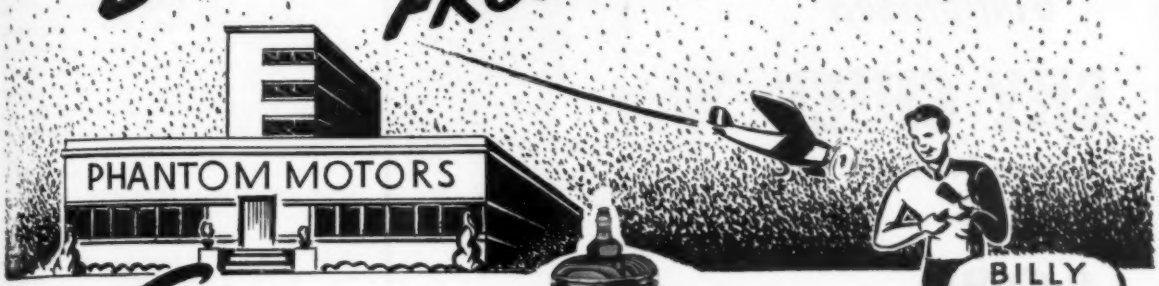

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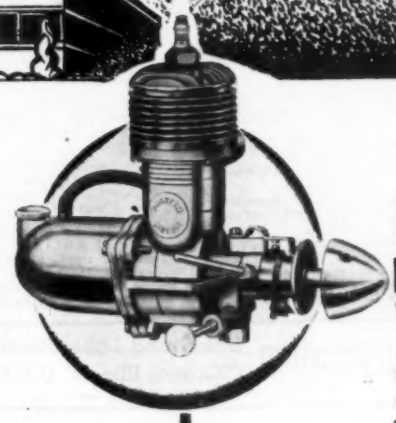
Names and complete information furnished upon request.



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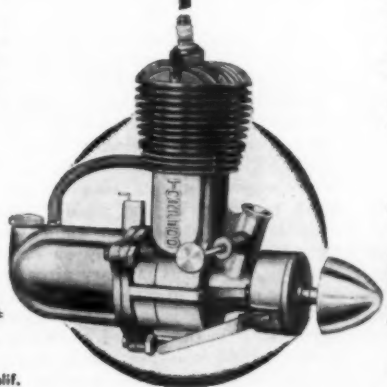
SPECIFICATIONS

1/7 h.p.; 2 cycle rotary valve; ¾" bore; ⅝" stroke; .275 cu. in. displacement; bare weight 4½ oz. Gravity feed carburetion; Diamond bored crankcase; hardened steel timing cam; solid steel case hardened crankshaft; die cast Magnesium connecting rod; lapped alloy steel piston; fully equipped heavy duty radial mounting.



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1/7 h.p. @ 14,000 r.p.m.; 2 port 2 cycle type; bore .725; stroke .724; static thrust 30 to 32 oz. plus; displacement .2989 cu. in.; weight 4 ¾ oz.; downdraft carburetion; plus size Magnesium gas tank; Champion V-2 spark plug, exclusive offset principle . . . easier starting, more power; metal enclosed condensers; additional crankcase fins; Diamond bored crankcase; oversize anti-friction bronze bearings; lapped alloy steel piston; die cast Magnesium connecting rod; special new type heavy duty radial mounting.

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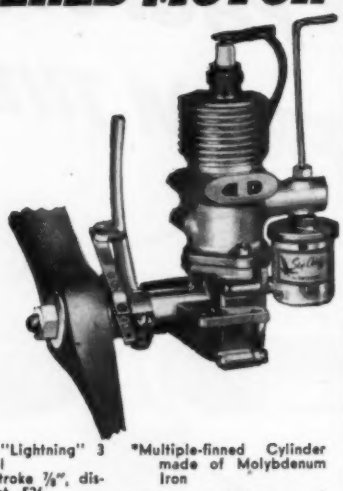

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the engines and propellers. Two large conical trumpets are mounted with their axes parallel and so that they can be rotated about a vertical axis. Flexible rubber tubes extend from the inner extremities of the trumpets to the ears of the observer. In operation, the trumpets are rotated around a vertical axis until, in the judgment of the observer, they are pointed directly at the source of the sound. A very small movement of the trumpets from this position causes an apparent movement of the source of the sound, far to the left or to the right. By this means, the direction from which the sound was travelling when it finally reached the observer can be determined with a high degree of accuracy. The importance of this device in anti-aircraft defense cannot be overrated.

Aviation's newest navigation and flight instrument is the sonic altimeter which operates on the principle of reflected sound waves. The prevalent types of altimeters indicate only the elevation of the airplane in which they are installed above sea level. We can readily perceive the advantage of knowing at all times the height of our airplane above the existing topography, as for instance a towering rugged mountain peak. The new device operates by means of regularly emitted radio waves, the altitude of the airplane at any time being determined by the amount of time required for the reflected sound to return to the operator of the airplane. Even the simple siren performs much useful work around a congested airport. This noisy device is universally employed to indicate the arrivals and departures of airliners. It has a tragic application also when used to clear a flying field of morbid and curious crowds in the event of a mishap.

However, unfortunately, sound also represents a disagreeable factor in airplane operations. In aircraft working on scheduled transport operations, the roar of the engine exhaust, coupled with the noise produced by the rapidly rotating propellers would be most unpleasant to the passengers, particularly on extended flights. As regards military aircraft, the surprise element so essential to successful aerial operations is favorably augmented, particularly in the case of low-flying airplanes such as those of attack squadrons, by the suppression of all possible noises.

The first case, that of the suppression of engine and propeller noises, represents a problem of considerable gravity. Power plant exhaust noises could, of course, be considerably reduced in volume through an installation of mufflers in a manner similar to existing automobile practice. Engine exhaust mufflers function in either inserting some form of resistance in the path of the exhaust gases or in reducing the discharge velocity of these gases. In either case, the result is unfavorable since considerable back pressure is exerted against the engine. The ultimate result is to greatly reduce the power output. In addition to this unfavorable feature, all of the existing types of engine exhaust mufflers are of extremely heavy construction and, hence, impractical for aeronautical use. Also, there are many other sources of engine sound besides that of the exhaust gases. The gears, cams, valves and other moving parts are all susceptible to vibration with consequent excessive noise. Metal cowlings, and even a muffler, when constructed of thin unsupported sheet metal, emits noises due to vibration. One suitable solution to this perplexing problem apparently consists in carrying the exhaust gases back to a position well aft of the passenger cabin by means of a long exhaust manifold. In some ideal installations, this arrangement has actually effected a slight decrease in the forward velocity of the involved airplane due to the small region of partial vacuum created at the orifice at the extremity of the exhaust pipe. Propeller noises created by high tip velocities which, in turn, result from the rather high rotative speeds of modern aircraft engines are a source of trouble in this respect. A solution to greatly minimize propeller noise consists in gearing the propeller shaft to the actual engine crankshaft so that the propeller will turn, for instance, at one-half the speed of the engine itself. This arrangement also reflects greater values of thrust for a specific engine and propeller combination. However, gears must be chosen for this application which are highly efficient and comparatively silent, since, otherwise, the advantageous features of noise reduction may be neutralized. Since the vibration of the highly flexible propeller tips are responsible for the greater proportion of the total propeller noises, thickening of the tips might possibly be resorted to as an experimental solution to this problem. This expedient would, however, tend to destroy or mutilate the airfoil characteristics of the blade (propeller), in addition to increasing the gross weight of the entire propeller assembly. With the advent of high horsepower engines on high performance pursuit aircraft, the problem of propeller noise has been more difficult to solve. Experiments are being made at the immediate time with six-bladed propellers to reduce tip speed and also eliminate some portion of the noise. See Fig. 2.

Attacking the difficulties emanating from engine and propeller noises at their source apparently represents a troublesome perspective. The proper method of procedure, then, is to work toward the soundproofing of the airplane interior. This is exactly what the aircraft manufacturing plants do. To fully appreciate the intensity of the noise in a modern air transport, should soundproofing be neglected for the moment, refer to the comparative loudness scale shown in Fig. 1. We start with a point of zero loudness and call this the "THRESHOLD of AUDIBILITY." Then as the intensity, or the amount of energy transmitted by the sound waves in a unit of time through a unit of area, an actual uncomfortable sensation is produced upon the human ear.

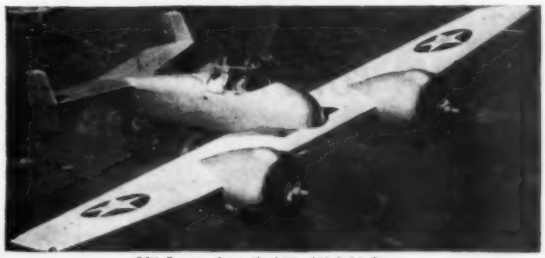
Soundproofing materials, as employed in airplane construction, are actually sound absorbing substances. Should no absorption of sound be provided for within an airplane cabin, the sound within will eventually build up to the same value as that outside. Earlier experiments in soundproofing of airplane cabins tended toward the employment of air spaces in a

manner similar to that followed in the sound insulation of large office buildings. This method of approach, however, proved fruitless. In fact, with light materials, as for instance aluminum sheet, the transmission through two sheets separated by an air space was greater than through a single sheet. In other words, the employment of air spaces is entirely ineffective in the sound insulations of airplane cabins.

The present method of sound insulation consists in inserting a layer of absorbent material between two panels. Balsam wool, cotton, hair, felt and kapok fibers, all function in a satisfactory manner in this connection. Floor coverings made of light cork linoleum find a wide application in modern airliners. When coated with clear lacquer, this material may also be employed for paneling the interior walls. Many of these sound insulating compounds are known by their trade names. For instance, "Paratex" is an upholstery filler made from curled hair impregnated with latex. It is manufactured in sheets and weighs only ½ pound per square foot. "Seapak" is kapok in a flexible sheet form. It is inserted as a sound absorbent blanket between the outer sheet metal shell of aircraft structures and the interior panel trim. It is frequently provided with a rope-paper lining to impart stiffness to it. It is flameproof and light in weight. Special forms of rubber cement are employed to secure the kapok blanket to the interior surfaces of the airplane cabin. See Fig. 3.

Unfortunately the uneven firing of radial engines does much to propagate noise. The firing order, being uneven, gives rise to a low pitch stacatto tone, whereas liquid cooled engines have a more pleasing sound, it being a high pitched tone. The vibration of the engine naturally imparts vibration to the structure of the airplane. The firewall, being right behind the engine, tends to act as a diaphragm, being vibrated at the frequency of the engine sound. In a shell type of fuselage this causes the noise level to be extremely high because the sound keeps echoing from one end of the fuselage to the other. The outboard disposition of the power plants does much to dissipate the intensity of sound inside the cabins, and on some of the new high winged cabin monoplanes, such as the DC-5, the noise is further reduced by the high location of the engines. The vibration of the engines is reduced to a noticeable extent (and with a consequent reduction in the sound level in the closed cabin) through the employment of rubber bushings which insulate the engine body from the engine mount. This is a step in the right direction. Furthermore, considerable rumble is being eliminated, this being due to metal control surfaces on certain types of airplanes, by the installation of ball bearing controls. Experiments have also shown the desirability of insulating one substance from another by means of a rubber gasket. An example of this is the imbedding of safety glass in a rubber gasket, thus separating the glass from the direct contact with dural.

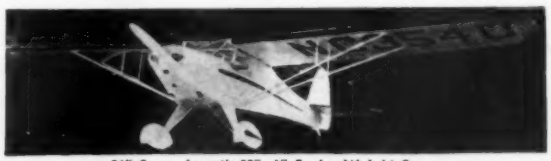
NEW GRUMMAN F5FI SKYROCKET FIGHTER



24" Span. Length 16". Weight 3 oz.

This is an exact scale model of the plane that was featured in the August issue of Model Airplane News

A sensational new scale model of the Navy's fastest fighter. Picture of actual model not ready at this time. The model flies well, using two 7" propellers. Const. set contains all parts printed on balsa, two 2½" turned balsa motor fronts, two 7" carved props, wheels, insignia, colored dopes grey and yellow, glue, full size scale drawing, and all parts. Const. set, postpaid..... $2.95



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A beautiful exact scale flying model with unusual flying range, so light it will rise from land or water in 6 feet. Const. set contains all parts printed on balsa, carved propeller, hardwood wheels, 2 oz. white dope, ½ oz. black, glue, full sized scale drawing, and all parts to build. Set p.p..... $1.50

CURTIS FIIC4 SOLID MODEL

10½" Span. Length 7½"

This is a special deluxe solid model. Set has completely finished balsa fuselage, cockpit cut out, routed pants, wings cut to shape, 1½" deluxe cast motor, alum. cowl, 3 bladed cast prop, paints, drawing and all parts. Set p.p..... $1.50

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32" Span. Length 25". 1" Scale

Finest equipped model in the world. Set has 4½" scale celluloid motor, aluminum cowl, 10" prop shown, alum. step plates and wing walks, insignia, rubber, complete set of four colored paints, full size drawings, wheels, and all parts printed on balsa. Const. set, postpaid..... $4.50

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Color Schemes: Model is all light navy grey, top wing yellow, red striping, black details.

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This 2¼" scale gas model is a beauty and flies well. Construction set has all body formers, wing ribs, tips, etc. cut to shape. Two 6" M & M pneumatic rubber tired wheels, rubber tail wheel. 16" carved propeller, 5 yds. silk covering, complete set of colored paints, glue, 9½" turned balsa cowl and motor unit, full size drawing and all parts to build. Const. set without motor p.p..... $25.00

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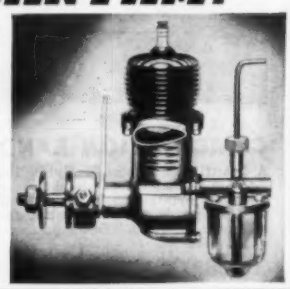

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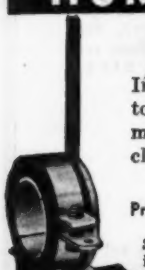

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Good Eyes—Fine Work

(Continued from page 34)

Do you rest your eyes, then, as you would your arm? Not if the model isn't finished —or are you the hundredth rather than one of the ninety-nine?

Because the arm muscles are larger they'll just about scream with pain when you've worked them too hard. That's Mother Nature's way of saying, "cut it out" and you quit holding the weight.

The eye muscles are much smaller and so they can only whisper under similar circumstances. Even if you manage to hear the whisper you give 'em a quick rub with the back of a dope-stained hand and keep right on torturing them.

Someone says, "All right, when should I stop and rest my eyes?" Well, conditions and people vary so the length of working time varies, too. A large model won't cause the strain that work on a small model will but here's a very important exception; detailed work on a small job under sufficient and properly placed lights will be easier on the eyes than slapping a big ship together with candles or kerosene pinch hitting for the Mazdas.

Yes, yes, the correct lighting fixtures might bend the bankroll a bit and delay the delivery of that new gas motor. But, after all, what good will any of your swell "makin's" do you if your eyes should go into a tail spin some time and fail to come out of it? That would really cramp your style.

Let's get the proper lighting set-up first. A flat top desk, or workbench, should have a shaded desk lamp or goose neck lamp for reading plans and blueprints. With a fair sized bulb, say a 60 watt, it will also provide sufficient light for all the "outside" work on the model. But be sure to keep the shade adjusted so that you're not looking into the light.

For additional light, that new indirect lighting lamp in the living room is tops, of course, but the family will probably defend that fixture with a Tommy gun. If you can't beg or borrow it away from them, a tall floor lamp with light parchment shade will serve the purpose almost as well.

Speaking of shades calls to mind the little shutter in front of your eyes (the iris). This little shutter opens in the dark and closes before bright light. With properly shaded lights the iris doesn't expand and contract constantly while peering back and forth from comparatively dark spots to the brilliance of an open and exposed bulb. The better the bulb is shaded, the less the iris works and the less fatigued the muscles become.

A while back we said eye muscle fatigue depends upon a number of conditions so let's talk a moment about the fellow who owns the eyes. You might work for an hour or more under the lights while right beside you Jim begins to rub his eyes after forty-five minutes or less.

Jim would be wise to lay down the tools a bit sooner under the circumstances but you are only kidding yourself if you keep on with your own work well into the second hour without letting your eyes rest, too.

Use good judgment in the matter. Stop every hour or so for a ten minute period and let your eyes get away from all kinds of concentrated work. And remember, switching from MODEL AIRPLANE NEWS to the Sat. Eve. Post isn't resting the eyes any for those ten minutes.

Well, we've got the plane finished and she's all set to fly. Your ship might be ready to take off but your eye troubles aren't. No sir!

You built that model to streak toward the sky and you're practically pinning your eyes to her tail as she starts her climb. Models don't throw much of a shadow so you know what you'll really be looking at. That's right, Old Sol himself, the greatest of all light sources, who'll make even that 100 watter in your shop lamp look like an anemic fire-fly with a burnt out fuse.

For short periods it is doubtful if any great harm could come to your eyes from watching your plane sail over the hill. However, two or three hours of looking skyward out in the sun is another story.

A good pair of sun glasses is a valuable part of your equipment. If you want to be certain that the sun glasses you buy are not hurting your eyes, as some do, take them to your eye doctor who will be glad to advise you impartially in this matter. Some of the cheaper sun glasses have what we call a "negative power" on them and this is certainly to be avoided, if possible.

In closing, let me remind you again not to abuse those eyes. Provide them with a few necessities they may require and, in most cases, your model building will help to keep your eyes keen and active.

Happy landings.

The Grumman Mono-Pursuit

(Continued from page 25)

surprising amount of resilience and he has yet to see a model employing this type of construction with the familiar accordian-folding nose that so often follows vertical dives.

Tail Surfaces and Cowl

The tail surfaces are of standard construction. The stabilizer is built in one piece for stiffness. Sand the leading and trailing edges to airfoil section after assembly. The cowl is built up in the usual manner from 1/8" and 1/16" thick balsa rings. Cover it with 1/32" sheet balsa.

The cowl on the test model was covered with tissue for lightness, but if the ship finally needs more weight at the nose, the balsa covering is a convenient way of adding it.

Landing Gear

Details of the landing gear attachment are shown on the drawings. The struts are 3/32" aluminum tubing over .028 music wire. The wire going through the long strut is continuous through the 1/8" x 1/16" side stringers and is looped at the center to avoid the rubber motor. The upper set of the short struts contains the wire which, as shown in the detailed drawing, is cemented to bulkheads D and F. To hold it in place, cement two 1/8" x 1/16" braces between the bulkheads and over the wire as shown.

Covering

Cover the model carefully with tissue, using thin longitudinal strips on the fuselage. If a colored model is desired, the authentic navy colors are all silver with the top of the wing chrome yellow.

Spray the model lightly with water and allow it to dry. Tack down, with clear dope, the loose edges of tissue that appear. Then give the whole model a coat of thin clear dope, or if colored tissue has been used, add a coat of thin dope of the same color as the tissue.

Add the stars on top and bottom of each wing tip, paint the wheel wells black and add the control outlines and lettering with India ink. Add fairings, cockpit covering, radio mast and tail wheel.

Propeller

Carve the propeller from a block of medium-hard balsa 6" x1 1/4" x 1/2". Give it two coats of silver dope, sanding between coats.

Flying

Glide the model, adding weight to the cowl if it stalls. Then try a powered flight. If the model stalls, warp the rudder slightly in the direction in which the model tends to turn. It is better to let the model climb in a spiral than to add down-thrust to prevent stalling. If the model still stalls, warp the trailing edge of the stabilizer down. To correct for spiral diving, apply opposite rudder or warp the inside wing's trailing edge down.

Flight performance depends, of course, on how carefully your model has been built. If you've done a light, true job you'll find it hard to keep your Grumman from flying at least thirty seconds.

THE "BIG THREE" OF THE AIRWAYS!

WITSNIPE

Complete WIT-KIT No. 32-JC. A high performance cabin plane that will win contests. Looks like a two or three-place job with streamlined fuselage and efficient tail group. Wingspan—32"; Length—22 3/8"; Weight—1 2/3 oz. 50c

50c

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Complete WIT-KIT No. 36-GP (less power unit). Class A model, advanced design. Special features, easy to build and adjust for best performance in contest flying. Removable motor unit, track for sliding coil fore and aft for trimming plane. Removable rudder and stabilizer unit for easy carrying. Polydihedral wing has high aspect ratio to give maximum performance. USA 35-B wing curve. Designed for Atom and other Class A motors. Balsa planking for leading edge of wing. Wingspan—36"; Length—26"; Wing Area—148 Sq. In. Weight complete with Atom motor 8½ oz. $1.00.

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Regular WIT-KIT No. 36-C. The famous Curtiss P-40 400-mi. per hr. pursuit plane, noted for speed, maneuverability and power for defense. Stable, steady, like its prototype, has long, flat glide. A flying replica. Wingspan—36"; Length—23½" Wt.—3 oz. $1.25.

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AIRPLANE DIVISION

WASHINGTON INSTITUTE OF TECHNOLOGY

McLachlen Building Washington, D. C.

Designers of the Air-Track Safe Landing System

CHICAGO—J. E. Menaugh Co., 549 Washington Blvd.

Uncle Sam Buys a Model Plane

(Continued from page 9)

developments we are working on pertaining to the automatic landing system," Capt. Holloman explains.

However, it is interesting to draw a parallel between the two inasmuch as Holloman has taken such an active part in each and both have to deal with pilotless planes.

Sometime ago a new Lockheed transport plane was brought to Wright Field for acceptance testing. When the test routine is completed this ship will be turned over to Capt. Holloman and those in the radio laboratory for experimental work with the new automatic landing system under test here.

The big problem right now is the development of the "straight line glide" landing. This is the new system which can be applied to the various automatic landing facilities now under experimentation. This "straight line glide" plus some "unknown" means of direction will be the ultimate objective of the experiments. This, from the experts who have been working on the tests.

In making the automatic landing the plane is brought over the field by means of the radio compass. Once over the field the pilot turns on the automatic landing device and by a series of curves completed through mechanical combinations of radio frequencies, electrical impulses and "iron mike," the gyro-pilot, the plane settles to earth without the aid of human control.

International News!!!

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13½" BREQUET
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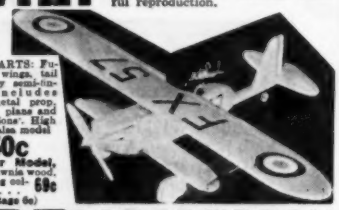

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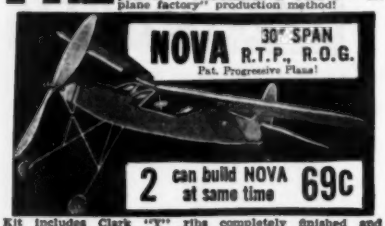

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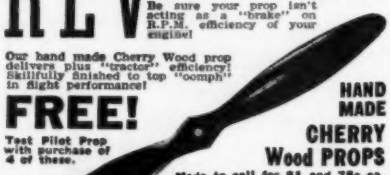

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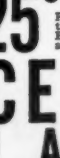

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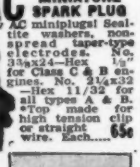

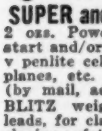

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At last here is the link between "Toy" and Transport.

Elements of Radio Control

(Continued from page 11)

the developments in the battery field. Here the control workers have been helped by a fortunate widespread popularity of portable broadcast receivers. This has forced the battery makers to bring out a large and varied line of small batteries, both A and B, most of which are equipped for plug-in connections, which are a great time-saver, incidentally. Furthermore, the cost of these small units is very reasonable as they are produced in large quantities to meet public demand.

Since most of the big battery makers have actively entered this field, the selection is remarkably wide, as is the distribution.

The use of plug connections as mentioned above is of great help in testing and field work, as it is a quick and simple matter to remove the units for test. Likewise, it is much easier to substitute large batteries for small when trying out equipment or tuning up in the field.

It is suggested that these plugs be removed from defunct batteries and used for connecting all parts of the control system to provide quick assembly or removal and assure good connections. The weight is negligible in most cases.

The control motors used in this work have been of practically infinite variety, limited only by the ingenuity of the builder. They have also been of many degrees of reliability, unfortunately; a shortcoming probably due in large part to the fact that most of the motors used have been of the model locomotive type designed to run on 8 to 20 volts with considerable power output. We have an entirely different set of requirements for our control work. In the first place, the available voltage is low because of weight limitations. Many locomotive motors, even those of the best design, are not reliable in starting when operating on 3 volts.

A control motor does not need very great power as it is always geared way down for this application. Builders will therefore welcome the Pitman control unit shown in Fig. 1, which weighs only about 3 ounces with cover. It is absolutely reliable in starting on 3 volts and works remarkably well on only 1-1/2 volts. This is an example of equipment built expressly for the purpose versus the makeshifts we have been forced to use in the past.

There are those, of course, who simply haven't the available cash to buy all the best parts. Certain parts, such as the tube, must be bought, but others have to be home-constructed if at all possible. For these, the sensitive relay is often a stumbling block due to its cost and the difficulty of home construction, and it was decided to see what could be done in the way of such amateur equipment. Fig. 2 shows the result. This relay will operate reliably on 1 ma. and weighs only 2 ounces. It does not, of course, compare with the well engineered factory jobs, due in some part to the lack of proper materials, but for those who simply must cut corners on cost, it will do very well for the majority of experiments.

A balanced armature is employed, since this is least susceptible to change in operating position and to vibration. The relay shown was built on a scrap of Bakelite 2-1/4" x 1-7/8" x 1/8" thick, but weight may be saved by building it right on the base of the receiver, if such base is of sufficiently substantial material. Balsa wood, of course, is not strong enough for this purpose.

The heart of the relay is the magnet coil and the best source of such coils ready-made is in the old "Baldwin Type C" headphones and loudspeaker units. These were made in huge quantities and practically every radio service shop has one or more lying around. The coils of other magnetic speakers may also be used. The resistance of these bobbins runs from 500 to 2000 ohms or over, and the highest possible value should be picked. The coil shown came from a Baldwin speaker unit and had the highest resistance of quite a few tested, about 1800 ohms. It is naturally possible to use two such coils in series by enlarging the core piece. When this is done, be sure to connect the coils so that they aid each other, or the resultant magnetic pull will be practically zero.

If you buy the speaker in a junk shop, be sure the coil is tested for continuity. Using a Baldwin unit as an example, proceed to dismantle it completely. Nothing is used but the magnet coil, which must be removed carefully to avoid injury to the fine wire windings.

The armature, a piece of thin iron pivoted in the center of the bobbin, must be removed; it is held by two slender wires and they may be broken by moving it sideways in the slot with a pair of pliers. Work back and forth carefully till both wires part; do not yank the armature out, as damage may be done to the winding.

The "U" shaped iron core piece, C, comes next, and is of soft iron. This must be filed or ground down until one end fits through the magnet slot. This piece should be about 2 1/4" x 9/16" x 1/16" before bending. It is formed to the proper "U" shape, the two arms of which are just 3/4" long. Two holes for 4-36 screws are made in the center section to enable fastening to the base.

The armature, E, is a piece of core metal taken from a disassembled audio transformer. This material has properties valuable for our purpose and is much better than ordinary sheet iron. The piece is 1/2" x 1 5/16" x 1/64" thick, though it may be thicker than this.

The armature is held to the core by piece D, which is simply a short length of No. 24 bare copper wire soldered to the core end. Before bending this piece, file two small notches in the edges of E so

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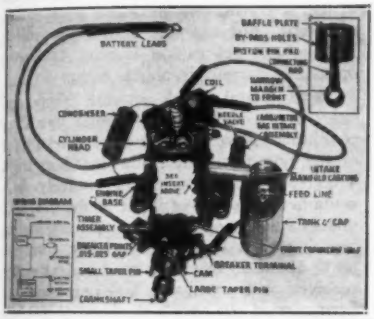

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that it may be held on the pole piece by D. Bend the latter until the vertical arms fit snugly in the notches, then solder D to C.

The core and magnet may now be fastened permanently to base A, with the two wires from A fastened to the terminal posts G.

Before E is fastened in place, solder F, two bits of silver, to the end for contacts. These may be obtained from various sources such as defunct relays, spark coil vibrator parts, and so on. Most auto supply stores carry Ford "Model T" coil vibrator parts for about 10c, from which good contacts may be taken.

Place the armature on the pole piece end and bend the vertical projecting ends of D tightly over the top. Then wiggle E up and down slightly to loosen it enough for about 1/16" free movement. The armature must move as freely as possible, but must not wobble.

The stationary contacts, H, are now made. Those shown in the photo came from a discarded cheap relay and are held by a single screw to the base with insulating washers to separate and space them. The contact screws should have silver or other suitable tips and are set to meet the contact points soldered on the armature.

There are many different methods of making the contact arms; the points to keep in mind are that they must be adjustable through a vertical range of about 1/8" and they must be reasonably rigid. Extra weight should be avoided, of course.

The next part to be made is the support, I, that holds the hairspring. A piece of brass, 1 1/4" x 1/4" x 1/16" thick, bent at right angles 3/8" from one end, will do. Drill a hole, J, for a 6-32 screw at the exact height of the armature from the base; this distance is 3/4" on the relay shown. Tap the hole, then slot the brass down the center for 3/8", and squeeze the ends slightly. Now, when a screw is run in the hole, it will be held tightly, but may be moved for adjustment.

The last item required is a hairspring from an alarm clock. The one used in this case is of brass with an outside diameter of 3/4" and has seven turns. It is soldered in a slot in the adjusting screw. Then the outer end is bent over and soldered to F, near the contact end. It must of course, first be fastened to the base in line with D before the last soldering operation takes place.

The relay is now complete. The upper contact should be turned to allow the armature to come very close to, *but not to touch*, the magnet end of the core. Then set the lower contact to allow 1/64" or less of movement. The hairspring is adjusted last and should be set for as much pressure as possible for the given operating current. The instrument illustrated will release on about two-thirds of the operating current, which is considered good for a job made of scraps. For example, it will operate on 1.5 ma. and release on 1 ma.; its lowest operating current is about .6 ma.

Experimental work in the shop and short range work under actual operating conditions have proved the convenience of the tiny transmitter illustrated in Figs. 4 and 5. This apparatus is entirely self-contained. The power input is about 1/2W. under full load, and is sufficient, when working with sensitive receivers, to work up to about 25 feet with no aerial at either receiver or transmitter; and operation has been carried out over a distance of 800 feet with an antenna on the transmitter only.

Two RCA-958 acorn tubes are used in a so-called T.N.T. circuit, which is extremely simple, as may be seen in Fig. 6. (The RCA-957 tubes may also be used, but must be operated at lower input current.) This consists of an untuned, center-tapped grid inductance and a tuned plate coil, also center-tapped. The key is simply two strips of brass, operated by the button near the forward edge of the meter in Fig. 4.

The case is of tempered pressdwood, though ordinary wood could be used as well, and measures 8 1/2" x 4" x 2 5/8" deep inside. At the rear of the container are two Burgess type W30FL batteries and just forward of them are two No. 2 flashlight cells. The latter are connected in parallel by means of contact strips on the side of the case and on a removable strip that holds the cells firmly in place. A pressdwood partition in front of the cells serves further to anchor them securely.

Next to the front come the two tube sockets mounted one above the other and spaced with bushings so that the tubes do not touch the case sides nor each other.

The coils are soldered directly to the socket prongs. L3 is a coupling coil which fits in between L2 and L4. The transmitter shown has a knob on the front panel to vary the coupling without opening the case, but this is not entirely necessary. The knob is on a threaded shaft and turning this moves L3 through a range of about 3/8", which is quite sufficient for the purpose.

C mounts on the front panel, but must be insulated from it. An insulated shaft was fitted to this condenser, as hand capacity was found to be annoying. The shaft was cut off short and a 4-36 flat head screw soldered to it. A 1/2" length of Bakelite rod was then drilled, tapped and threaded on the screw; the dial was fastened over this.

The meter is placed beneath the handle for protection and also because this location fitted in better with the other parts.

The panel is an aluminum plate, 4 3/8" x 2 7/8" x 1/16" thick and the labels for the various controls were printed on it with indelible ink, using a 10c store printing set. A coat of clear lacquer completes the panel and protects the printing.

After carefully wiring the set, turn on the power and observe the meter reading. It should be close to 3 ma.; if it is much higher, squeeze or compress the turns of L1, which should reduce it. The turns should be altered until the reading is as low as possible, and changing the length of this coil is the only means of tuning it. The output of the transmitter should be checked to be sure it comes within the 5 meter amateur band, and the dial accurately calibrated for the purpose.

The antenna consists of two halves as seen in Fig. 6; each half may be made up of two or more telescoping tubes so that the whole thing can be collapsed to reasonable dimensions. The rods fasten on a sturdy strip of Bakelite 8" long, which in turn is held by the antenna posts on the transmitter. The whole thing is held by wing nuts so that it may be quickly and easily disassembled.

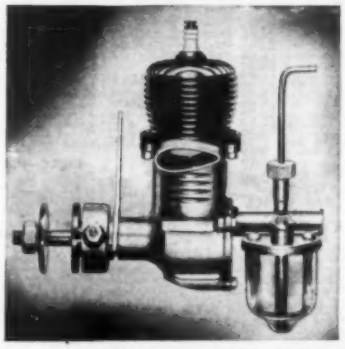
Set the tuning dial to 58 mc. and with the antenna in place, slide the tubes in or out until maximum plate current is flowing. The rods should be adjusted equally from both ends so that when highest current shows on the meter each side is of the same length. They will probably come to about 44" each. Do not allow the plate current to go over 6 ma.; reduce coupling if it rises above this value while adjusting the antenna.

This little transmitter will be found extremely useful for both experimental and actual flying work. It will be found to impress an audience much more than will a bulky and cumbersome transmitter when giving demonstrations.

PARTS LIST

V1, V2, RCA-958 tubes; R, I.R.C. 1/2 Watt 50,000 ohm resistor; C, Hammarlund HF15 variable condenser; sockets, Hammarlund No. S900; M, Triplett model 223 meter 0-10 ma.; "A" battery, 2 Burgess No. 2 cells; "B" battery, 2 Burgess No. W30FL 45 Volt batteries; L1, 17 1/2 T No. 14 bare, 11/16" diameter, 2 1/8" long; L2, L4 each 7T same wire 11/16" dia., 7/8" long, separated 1/2" at center; L3, 3T same wire and dia., 3/8" long, adjustable; RFC, Bud high frequency choke, No. CH925.

"THE WINNAH—AND STILL CHAMPION"



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1/16x1/16 100. 5c
1/16x⅛ 35 for 5c
1/16x3/16 18. 5c
1/16x¼ 15 for 5c
3/32x3/32 30. 5c
⅛x⅛ 30 for 5c
⅛x¼ 10 for 5c
3/16x3/16 8. 5c
¼x¼ 6 for 5c
¼x⅜ 3 for 5c
1/64x2 4 for 10c
1/32x3 8 for 10c
1/16x2 8 for 10c
3/32x3 7 for 10c
⅛x2 6 for 10c
¼x2 3 for 10c
3" sheets or 36" lengths, double above prices. 4 foot Balsa, double 36" prices. Add 10c pckge. chge. for 36" lengths—20c for 3-foot lengths.

SHEETS 12"x2"
1/16 10 for 10c
⅛ 7 for 10c
¼ 3 for 7c

18" PLANKS
1x1 5c; 1½x2 6c
1x1½ 9c; 1x2 10c
1x3 15c; 2x2 19c

WIRE
6-8-10-12-14
2 ft. 1c
1/16 dia. 5 ft. 12c
.050 3 ft. 5c
3/32 dia. 5 ft. 15c
⅛ dia. 5 ft. 25c

PROP SHAFTS

REAR HOOKS
12 for .8c

CAMEL'S HAIR BRUSHES
Small 3c; Lge. 5c
Extra large..... 8c
Flat, large..... 10c

PROP BLOCKS
⅛x⅜x6 6—5c
⅜x1x8 3—5c
¾x1¼x10 3c ea.
¾x1¼x12 3c ea.
1x1½x12 4c ea.
1x1½x15 7c ea.

REED
1/32-1/16 2 for 1c
3/32 or ⅛ 1 ft. 1c

WHEELS per pr.

Birch	Balsa	Celu
½	.01	.03
⅝	.02	.04	.05
1	.03	.05	.07
1¼	.04	.08	.10
1½	.07	.10	.16
3	.15	.15	.30

PROPELLERS

Balsa	Paul-O-	
Mach. Cut	Wina	
5"	4c	10c
6"	5c	15c
7"	6c	20c
8"	7c	25c
9"	8c	30c
10"	8c	35c
12"	10c	45c
14"	14c	
15"	15c	55c

Hookup wire, ft. 2c

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New low prices on orders for $2.50 or more. *Dealers send 3c for Wholesale List.*

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COL. or CLEAR DOPE
1 oz. .5c
Large bot. .8c
½ pt. .35c

CLEAR DOPE
½ pt. .30c

TISSUE, AA
All col., doz. 19c
Silver ea. 5c
Supertone, wh. 5c

INSIGNIA
24 and stripes 5c

RUBBER
.045 .25 ft. 5c
1/16 sq. .15 ft. 5c
⅛ flat. .15 ft. 5c
Skein .55c
3/16 10 ft. 5c
Tubing ⅛ ft. 5c

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1 doz. ⅛ or ⅜ 1c

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½" 12 for 8c

18" BAMBOO
1/16x¼ 6 for 5c
Shredded, 36—6c

SPONGE RUBBER WHEELS
pair 1" .15c
1¼" .18c

CELLULOID
6x8 .5c
12½x16 .19c

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Paste, can .10c

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1/16,3/32,⅛,ft.7c
3/16, ¼, ft. 10c

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.0004x4x15
2 sheets 3c
.005 in.—4x6...5c
.010 in.—4x6...6c

DOWELS
1/16x6" ...doz. 5c
⅛x18" ...2 for 3c

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½" or 1" Pkge. 5c

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THRUST BEARINGS, dz.
Sm. 10c, lge. 15c

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1/16x1/8	35 for 5c
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1/16x1/4	15 for 5c
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1/8 sq.	30 for 5c
1/8x3/16	12 for 5c
1/8x1/4	10 for 5c
3/16 sq.	8, 5c
1/4 sq.	6 for 5c
1/4x1/8	3 for 5c

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1/64x2	6 for 10c
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1/16x2	8 for 10c
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1/4x2	6 for 10c
3/16x2	3 for 8c
1/4x2	3 for 9c
3/8x2	3 for 11c

3" & 36" cost twice 18"; 3x36, 3 times.

NOSE BLOCKS

1x2x1	1c
2x2x1	2c
2x2½x1	3x3x3 9c
	5x5x2 17c

5 FOOT BALSA

1/8x3/16	12 20c
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1/4 sq.	6 20c
1/4x1/2	3 20c
3/8 sq.	2 20c
1/2 sq.	2 20c

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2x2	1 for 16c
2x3	1 for 22c
2x6	1 for 38c
3x6	1 for 72c

Plastic Balsa

4 oz. 23c, 1 oz. 10c

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1/2x3/4x5	7—5c
1/2x3/4x6	6—5c
3/4x1x8	3—5c
3/4x1 1/2x10	2—5c
3/4x1 1/2x12	3c ea.
1x1 1/4x12	5c ea.
1x1 1/2x15	6c ea.

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CEMENT CLEAR DOPE THINNER Banana Oil

1 oz. 5c, ½ pt. 30c
2 oz. 9c, pint 50c

Colored Dope

1 oz. 6c, 2 oz. 11c
½ pt. 35c, pt. 60c

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H'vy qual. 45c yd.

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1¾, 2—50c
2¼, 2½—60c
Gas Mod. 2¾—$1
3-1.25—3½-1.50
4½-1.75

M&M WHEELS

1¼, 1½, 1¾—50c
1¾, 2, 2¼—60c
Gas. Mod. 2¾—90c
3¼ 1.50, 3½ 2.75
4½ 2.75—5 4.00

PROPELLERS

Balsa Paulo Ritz Wing Gas Mod.

5- 4c- 7
6- 5c- 9- 8-35c
7- 6c-12- 9-35c
8- 7c-15-10-35c
9- 8c-19-11-35c
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1/16	.6c... 8c
3/32, ⅛	.7c...10c
3/16 ¼	.9c...12c

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.003 10c .010 15c

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3 sheets.....5c

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⅛x½	.....15c ft.
¼x¼	.....22c ft.

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1¼"	.....2 for 11c
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Washers, pinhole, ⅛x¼, 2 doz. 5c
Prop Shafts, doz sm. 6c, large....10c
Ball Bear; 1/16 15c ea., 1/8.....33c
Nose Plugs for 5c; ½"—6, ¾"—4, 1" 4.

MUSIC WIRE finest quality

.014	6 ft. 2c
.020 .028	6 ft. 3c
.034 .040	6 ft. 6c
.049	6 ft. 8c
1/16"	3 ft. 5c
3/32"	5 ft. 15c
⅛"	5 ft. 20c

WHEELS per pr.

Bush	Balsa	Alum
	Celu	L
⅛ .01	.03	U
¾ .02	.04 .05	M.
1 .03	.05 .07	.06
1¼ .04	.07 .10	.09
1¾ .06	.10 .19	.13
2½	.15	
3	.15	.30

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1/16 sq. 15 ft. 5c
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Med. 5c, Lge. 8c
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½ doz., Sm. 3c
½ doz., Lge. 7c

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1½" 8c, 2" 12c
2½" 14c, 3" 17c
4" 50c, 4½" 65c

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¾" 2c, 1¼" 4c
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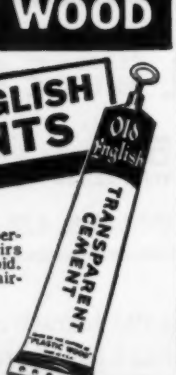

This "fixer" quickly and permanently joins and repairs china, glass, wood, celluloid. Excellent for use in model airplane making.

TRANSPARENT OR METAL COLOR

Simple Plastics for Models

(Continued from page 23)

sheets or old photo-negatives, etc.). It is dissolved in its commonest solvent, acetone, to a degree of a taffy-like mixture (not thin or lumpy). It is advisable to permit a day to let it settle well. The addition of a small portion of methylated spirits aids in a more complete and quicker dissolving action. To this is added a quantity of plastic wood (sold throughout the country in cans and tubes) to the extent of one and one-half 25c size tubes to a pint of the above dissolved celluloid. Be careful, for too much plastic will tend to make it brittle and too little will produce a very pliable and shapeless product.

It would be to no advantage to give a definite formula because it would involve the use of raw materials; such as nitro-cellulose (gun cotton) which is dangerous to handle, and other highly inflammable materials. The above outline will give practical results if closely followed.

This mixture is applied by brush to a well-vaselined form; for example, a solid balsa wheel pant. This form should have a small hole in it, so that a dowel or instrument can be inserted, enabling you to hold it so that the plastic can be brushed completely around it. The application of a thin coat first is suggested, and when partially dry to a point of losing its stickiness when it is touched, and has assumed a dull shade, a second and last coat may be laid on. Do not brush too hard; the mixture is quite thick and might disturb the underneath layer. A period of a day or two is necessary for complete evaporation of the acetone. In drying, shrinkage takes place to a considerable degree and it takes on a natural, smooth surface.

It is advisable to aid drying by blowing or by warm air, but not intense heat. This is necessary until it sets on the form and prevents dripping or running. This whole operation takes only about twenty minutes to a half-hour for average-sized jobs.

Upon complete drying, split the shell by means of a razor-blade and remove from the form. An extremely neat seam can be made with any ordinary quick-drying airplane cement. A slight sanding, wood filler and the required color as finish will give you a perfect product.

The wheel covering and the pant in the accompanying photo weigh one ounce each, the cowling, one and one-half ounces.

You will notice that, upon application, the plastic seems very thick. A layer up to one-eighth of an inch will shrink down to one-sixteenth of an inch upon drying, which gives you a very fine, thin shell. With practice, one can predetermine the desired thickness required.

Its uses are limitless; such as, for pontoons, flying boat hulls, cowlings and streamlined parts. A complete plane could be made without any trouble, only a little care. It would be necessary to use one or two bulkheads for landing gear and wing attachments, otherwise only a solid form of the plane on which to brush the plastic would be necessary, and then simply split into advantageous halves for joining.

A few pointers in conclusion: Make the mixture so that it will flow, but not thin and bodyless so that it runs. Plastic wood is added to give it strength and hardening characteristics; if too much is added it becomes brittle. It is advisable to experiment on a small article first; for example, a wheel pant, until the result is seen and appreciated. Make sure that the wood form is well vaselined to prevent the plastic from adhering to it. Put the plastic over the whole form, and cut out the wheel space when dry. This is necessary, due to shrinkage. If thin spots are visible before removing from the form, simply add more plastic. It will settle and smoothen out itself. If the plastic drips or runs on large areas after it has lost its stickiness simply press into shape with your fingers and leave overnight. Use only sufficient acetone to dissolve the celluloid, too much will cause it to "sweat" in drying and is very difficult to handle. A good test is to blow on the material and if it becomes dull and stays

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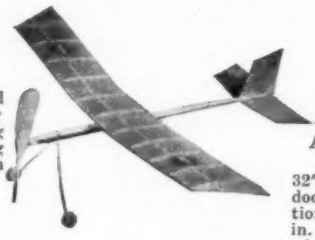

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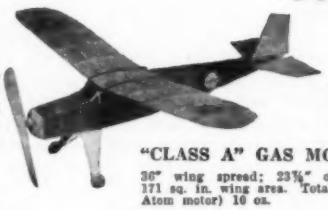

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dull its content is correct. The longer the plastic is permitted to settle before using, the fewer minute air bubbles will appear. Their occurrence is not a bad feature altogether, because they aid to keep the object lighter, and for our purpose strength is not impaired by their presence.

The Greatest Bomber in the World

(Continued from page 23)

Whew! Sounds pretty complicated, doesn't it? Well, brother it IS! But for those of us who don't give a hang WHAT the airfoil is, but are interested in HOW it operates, here are the aerodynamic qualities of the Davis Wing. Wind tunnel tests now borne out by flight tests on the Consolidated Model 31 Flying Boat show that the airfoil has twenty-five per cent LESS profile drag at low speeds and ten per cent LESS at high speeds. It has a lift-drag ratio at normal flying angles of 20 to 1 as compared with the 13 to 1 found on other widely used sections. Therefore, we see that with this GREATER lift, the wing area may be greatly DECREASED, thereby decreasing both profile and parasitic drag on the wing as a whole. In addition, the actual profile drag of the airfoil section itself is ten per cent LESS, which makes a total effective percentage gain in aerodynamic qualities of something like seventy-five per cent!

And in addition, the wing loading, due to the reduced area, jumps to around the supposedly dangerous but now regarded safe 45 to 50 pound mark. Add these three qualities up and you get ONE big answer: SPEED! And that is the keynote of this month's Plane on the Cover; the Consolidated XB-24 four-motored mystery bomber!

Basically, the XB-24 is a four-motored, high-wing tricycle all-metal monoplane bomber equipped for either high-speed short-range or reduced-speed exceptionally long-range missions. This is the first landplane to be constructed by Consolidated in its new home in San Diego and marks the re-entry of the huge firm into a field it left when the last of the speedy single-engine monoplane "Fleetster" type was delivered. From its original conception, the XB-24 was designed around the Davis wing. For as Davis himself says: "The full benefit of my airfoil can be obtained only if the entire ship be designed around it."

The fuselage hull of the XB-24 is built in a single unit of conventional monocoque construction employing flanged 24ST formers, extruded channel-type stiffener stringers and hi-duty extruded longerons. This framework is covered with 24ST "Alclad" aluminum sheet flush riveted throughout. The entire lower mid-section of the fuselage is left open with the load carried by beam-type longerons to permit the installation of the bomb doors and racks. The nose of the ship is also open structurally. The forward gunner and bombardier's compartment is completely glass-enclosed and due to the use of the tricycle landing gear design and the impossibility of a nose-over, the framework in the nose has been kept to small widths so that the vision in the entire forward sphere is practically unhampered.

The pilot and co-pilot are seated side-by-side high atop the fuselage, forward of the wing. Complete navigation, flight, engine performance and fuel, oil and hydraulic controls are arrayed in the familiar Consolidated panel across the front of the cockpit. The radio operator-navigator is located aft of the bomb compartment with a small walkway interconnecting the two stations. He is equipped with a complete command set for receiving and sending in code or voice, a direction-finding loop, radio marker beacon receiver and interphone installation. The rear gunner and flight crew member, who also functions as relief radio man, is located in the extreme aft end of the fuselage. The commander of the ship is located just behind the pilot and co-pilot and has a small "office" fitted with desk, interphone and specific instruments for his personal use. The small window immediately above his head may be opened for instructions to the crew while handling the ship on the ground and for scouting while aloft.

The bomb bay is located immediately under the wing and extends almost the complete height of the fuselage. It is exposed by the sliding of clam-shell doors which open outwards to a point four feet above the bottom of the fuselage. The doors slide upward on tracks and rollers.

Entrance and exit to the ship is accomplished through the main door located on the left side of the fuselage just aft of the wing trailing edge. Emergency exits are located above the pilots' cockpit and in the rear gunner's station.

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BAMBOO TISSUE

The main wing of the XB-24 uses the Davis airfoil out to the tips where it merges into a conventional NACA reflex section to reduce tip loss. As for details of the outline of the Davis airfoil, it follows a smooth concave outline on the upper surface. However, its lower surface has a generated reflex curve aft of the rear spar location. In outline it much resembles the famed Clark Y section varying from the flat lower surface of the Clark as noted above. However, it is somewhat thinner than the Clark, making necessary the use of multi-spars for adequate support, further necessitating this principle due to its proportionately narrow chord and extremely high aspect ratio which gives the XB-24 its tremendous long-range capacity.

The two spars are built up on the full cantilever box beam principle of milled bar stock chrome-molybdenum steel heat-treated to 125,000 psi tensile strength. The engine mounts, of chrome-moly steel tubing, are bolted directly onto the front spar. The nacelle itself is of aluminum alloy bulkhead and stringer construction covered with 24ST "Alclad" sheet.

Power is supplied by four Pratt & Whitney Twin Wasp Model S3C4-G double-row radial air-cooled motors developing 1100 horsepower at 2550 r.p.m. at 6200 feet altitude and having 1200 horsepower available for five-minutes duration at take-off at 2700 r.p.m. This engine operates on 95 octane fuel and is equipped with a two-speed supercharger which parallels closely the high and low gearing on an automobile. In other words, the blower of the supercharger is geared to the engine in the ratio of 7.15 to 1 in low gear and 8.47 to 1 in high gear. Each engine drives a Hamilton Standard three-bladed constant speed Hydromatic all-metal propeller. The propellers are 12 feet in diameter and are capable of being full-feathered in the event of a single motor failure.

The exhaust stacks terminate in flush faces on the outboard side of each nacelle. The carburetor air intakes are located underneath each carburetor, which are of the up-draft type. The oil coolers are located within the leading edge of each wing, air intakes being of the fixed type in the nose skin and mounted on the outboard side of each nacelle. Each oil temperature regulator is equipped with an automatic thermal relief valve in which the cold oil is bypassed back to the main oil tanks, which are located in each engine nacelle, and the hot oil through the radiator.

The ailerons are of all-metal construction and are fabric covered. They are dynamically and statically balanced through the use of lead counterweights bolted into the leading edge. The flaps are of the Fowler type modified somewhat to the exclusion of the "eves-drop" runners formerly employed on the design. Airspeed indicators are located in the leading edge of both outer wing panels.

The landing gear is of the tricycle design employing a single small nose wheel and two large main landing wheels in each inner wing panel. The nose wheel is located just under the fuselage aft of the nose gunners compartment and is of the single fork smooth contour design. In retracting the wheel swings forward and up into the fuselage. The wheel itself serves as an airstream seal making the use of a retracting plate unnecessary.

The main landing gear wheels are over four feet in diameter and are also of the single fork smooth contour type. Each wheel is supported by a single short-travel pneudraulic shock strut and operated by two hydraulic struts. Each main landing gear wheel retracts by swinging outwards and upwards into the wing and outer engine nacelle recess, the wheel itself lying exposed along the under contour of the wing.

Operation of the landing gear and wing flaps is accomplished through hydraulic control. The main hydraulic fluid reservoir is located just under the pilots' cockpit and accommodates seven gallons of Lockheed No. 5 hydraulic fluid.

A constant flow of the fluid under a pressure of one thousand pounds per square inch is maintained through the use of two engine-driven hydraulic pumps mounted on each of the outboard engines. Control is maintained through the use of a single diverting lever which routes the fluid under pressure into the selector valve. From thence it is controlled by the manipulation of the landing gear and wing flap position control handles located adjacent to the co-pilot on the right side of the cockpit. Position indicators of the autosyne type show the exact location of the wing flaps in degrees and the landing gear in the "UP" or "DOWN" position at all times. The landing gear position latches are also actuated by hydraulics with emergency mechanical latches used for the down position. A warning horn and visual indicator are located on the co-pilot's instrument panel.

The tail surfaces are of the full cantilever type employing a single rectangular horizontal stabilizer. At the extremities of this structure are bolted the vertical stabilizers which are of elliptical plan. The rudders and elevators are of all-metal construction fabric-covered and are dynamically and statically balanced through the use of counterweights in the form of lead weights bolted into the nose section intercostals.

Main fuel tanks are located within the inner wing panels. Four tanks are utilized, the two larger having a capacity of 162 gallons, the two smaller located between the engine nacelles having a capacity of 143 gallons; making a total fuel capacity of 610 gallons. Each oil tank, located within the power plant section of the engine nacelle immediately forward of the firewall sheet, has a capacity of 14 gallons with ample foaming space provided for.

Items of equipment include complete photographic installation provisions for mounting a type K-3 camera, a vertical view finder and intervalometer and vacuum lines for control. The camera equipment is mounted vertically in the belly and is exposed, when in use, by the retracting of two metal plates.

Standard United States Army Air Corps bomb racks are mounted within the bomb bay. Accommodations have been made for nine tons of bombs, including various combinations of demolition and fragmentation bombs from the small 25 pounds of the latter variety to the huge one-ton aerial torpedoes used so flagrantly, yet effectively, in Germany's conquest of France.

Implacements for eight parachute flares have been made in the rear portion of the

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*3 Front Places in Class "C"

There's no 'prima donna' in Herkimer 'O.K.' engines—day-in, day-out performance, whether in the heat of competition or carefree pleasure flying, is consistently excellent. Gratifying performance at The Nationals confirms this. Of the six entries powered by our recently introduced 'O.K.49'—three placed in front! This appears to be the best 'prize-winning' percentage. We invite you to get acquainted with 'O.K.'—there's a fine model especially developed for your particular requirements.

*Data compiled from incomplete returns. Later reports may change this and add to the outstanding record!

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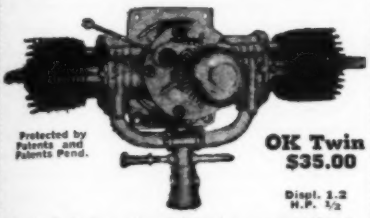

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Flying weight—coil, condenser ..... 11½ oz.
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Standard	.604	16.50
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Twin	1.208	35.00

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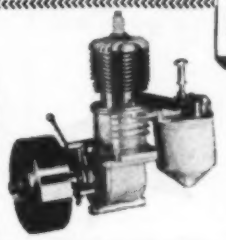

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fuselage, all of which are released individually or collectively from handles in the pilots' cockpit.

Complete oxygen equipment has been provided for the six-to-nine man crew; fixed cylinders being installed immediately behind the cockpit for the use of the pilot, co-pilot and ship commander and small portable capsules being strapped to the mobile members of the crew.

Emergency provisions include three emergency exit doors, complete flotation equipment within each outer wing panel, Lux-type fire fighting pressure installations in each power plant section, and seven hand fire extinguishers of the one-quart hand type mounted in strategic locations about the fuselage.

The United States Army Air Corps has awarded a contract for 46 model XB-24 bombers at a cost of $11,365,000. In addition, there are now orders on hand for 80 of the huge ships for the French Air Commission. This latter contract has been assumed by the British Purchasing Mission and construction has been ordered to continue as originally scheduled.

And when it is borne in mind that David R. Davis, the little man with the big brain, is awarded approximately $1,200 for EACH wing utilizing his airfoil, we see that he definitely HAS something there!

Performance figures are, of course, still on the air corps' restricted list but some impression of the ship's aerial activity was gained in an interview with Bill Wheatley, Consolidated's big, tanned, strong-jawed Chief Test Pilot.

"Naturally, Mac," said Wheatley, "I can't give you the exact performance figures on the 'bullfish' as we call it, simply because I don't know. All the test figures have been turned over to our aerodynamics and power plant department for translation from indicated figures to actual figures. However, from my own personal observation, this job is the fastest bomber in the entire world and I happen to know that Germany's Heinkels, which are only half as big and heavy as our job, does over 325 miles per hour. As a matter of fact I have repeatedly outrun Grumman F3F's from North Island in less than a mile."

Therefore, we can safely assume that Consolidated's big "bullfish" has a top speed much nearer the 350 m.p.h. mark than any bomber now aflying. But the XB-24's main quality is its long-range capabilities which are said to be in the neighborhood of 3,000 miles!

One of aviation's most interesting phenomenons occurred when Bill Wheatley took the XB-24 up on its first high altitude test flight. As some students of flight into the sub-stratosphere know, the blood, at high altitudes, gives up its nitrogen in the form of bubbles which are released from the joints giving the pilot the affliction now popularly known as the "bends." As the XB-24 nosed into the stratosphere, Bill Wheatley began giving off these nitrogen bubbles at so great a rate that his oxygen supply could not compensate for this loss fast enough. As a result of this experience he landed with the vision of his right eye practically gone. It remained impaired for several days and in desperation he flew to the famed Mayo clinic where adequate pressure chamber treatment restored his vision. The blood vessels of the eye do not begin their nitrogen liberation until the subject has reached the lower layer of the stratosphere which is 36,000 FEET!

Uncle Sam may justly be proud of having developed, through the aid of a lonely, radically-minded engineer and his dream of "the perfect airfoil," a bomber whose 350 m.p.h. top speed, 3,000 mile cruising range, and 36,000 ft. ceiling the most efficient bombing plane in the entire world!

A Winning Contest Seaplane

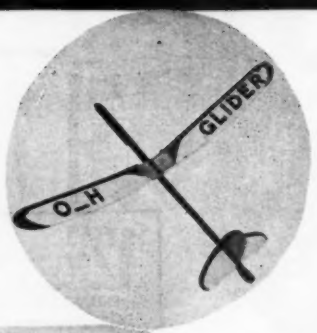
(Continued from page 13)

as separate units in order that they may be built on a flat board, rather than in "mid-air" as is the custom when using the keel or jig methods.

Start construction by cutting out the fuselage formers. Trace the half-formers, shown full size on Plate 3, onto a sheet of stiff cardboard and cut out accurately with scissors. The formers are then cut from 1/16" sheet balsa of medium weight and flexible grain, by cutting around the cardboard patterns with a razor blade. If you have a small file of the correct width the stringer notches can be more quickly filed than cut. Note that the nose and tail plug formers, numbers 1 and 10, are 3 ply, and should be cemented cross-grain. Two each of all the other half-formers are required, with the grain vertical, and cut to 1/4" width, as shown on "F" 6, Plate 3. When these are finished lay them aside in order.

Draw a full size side-view of the

O-H Contest-type High Altitude **GLIDER**



Above: Model in flight position. Glide app. 5 to 1.

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Left: Model folded, ready to launch, to altitudes of 60 to 100 ft.

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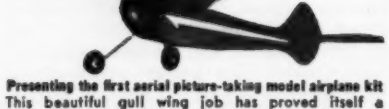

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KIT CONTAINS—Finest grade wood, cut-out ribs and formers, red bamboo paper, ½ pint cement, ½ pint dope, hardware, ignition wire, full size plans, complete illustrated instructions, hardwood wheels, UNIVEX CAMERA AND ROLL OF FILM.

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fuselage, using the dimensions shown on Plate 1. This drawing is to be used as the pattern for the left half of the fuselage. Now trace this drawing on the reverse side of another sheet of paper to get the pattern for the right side of the fuselage. Lay the drawings on a flat, smooth board or bench and pin strips of 1/32" x 1/8" balsa along the top and bottom outlines. Cement the formers in their proper positions, being sure that they are not placed upside down. Test them occasionally with a small set square to make sure that they remain vertical to the board while the cement hardens. They should be left to dry for about 30 minutes. When this is dry, cement and pin the wing mount, of 1/8" x 1/8" balsa, in place in order to keep formers 5 and 6 rigid. Now add the 1/16" x 1/16" hard balsa stringers, holding them in place with pins and weights. These must be left to dry for several hours, preferably overnight, so that the structure will not spring out of shape when removed from the board. At this time laminate the nose block from 1/8" sheet balsa, and bend the rear hook from No. 18 music wire and the landing gear mounts from No. 12 wire.

The fuselage sides are removed from the board and cemented together all along the top and bottom stringers, being held tightly with rubber bands and pins until dry. Fill in the sections between formers 1 and 2 and between formers 9 and 10 with 1/16" soft sheet to prevent these sections being crushed by handling. Also, at this time, cement the landing gear mounts in position on formers 2, 3 and 4. Where these wires extend past the surface cement small pieces of 1/16" sheet around them to permit an easier covering job. When these are dry, sand the structure thoroughly but carefully with No. 2-0 sandpaper. Cut off the tail plug through the centre of former 10. Add the rear hook, cementing well. Fit nose and tail plugs snugly.

The fuselage may now be covered, with the exception of the tail boom, which must wait until the stabilizer is cemented in place. Double covering is recommended. The second layer of tissue is likely to cause trouble unless the following proper procedure is followed!

If you examine a sheet of tissue, you will note that one side of the sheet has a more glossy surface than the other. This glossy side is partially waterproof and if it is water doped when another sheet of tissue is touching it the sheets will tend to stick together, causing numerous small wrinkles which cannot be pulled out. For this reason exercise care to see that the dull surfaces only are allowed to touch each other. The first layer should be applied in small sections with grain lengthwise along the stringers and the dull side on the outside. This is water sprayed and when dry given one coat of heavy dope. The second layer is applied with the grain at right angles to the first and with the dull side on the inside. It is also water sprayed and given two coats of dope.

Tail Surfaces

Full size drawings are required for these, the dimensions being shown on Plate 1. The spars are tapered and notched before being pinned to the drawing. Pin down the leading and trailing edges and cement the bamboo tips in place. When dry they are raised on the pins by blocking up with 1/4" balsa scraps. Cement the ribs in place. After removing from the board, cover the stabilizer centre section, top and bottom, with 1/32" soft sheet. Like all other parts to be covered, the tail surfaces should be sanded with fine sandpaper, being careful to remove any cement which might touch the covering. The tissue is applied with the grain parallel to the ribs and should be given two coats of dope. The stabilizer is now cemented in place, being set at zero degrees. Fill in the corners and curves with 1/16" scrap balsa. Cover and dope the tail boom. Cement the rudder in place with 1/16" offset for right turn. Small wire hooks and rubber bands are used to hold the tail boom in position.

Landing Gear and Floats

The landing gear, of bamboo and wire, is shown on Plate 1. The ends of the struts are bent into small circles for clipping onto the wire mounts installed in the fuselage. The centre "V" strut is of one piece with the ends serving as axles. The rear strut for the float gear is also of one piece of No. 18 wire formed to fit the lower half of the fuselage. It is held in place with rubber bands so that it may be moved to vary the position and incidence of the floats.

The floats are built by the half-shell method described for the fuselage. The keel stringers should be cut to shape rather than bent. The mounting wires as shown on the side view, Plate 1, are in the shape of a "V" with one end bent into a small circle to accommodate the struts and the other end extending through the side of the float. They are later bound to the float joiners to strengthen the floats sideways. Cement these wires in place and also cover the bottom of the floats with 1/32" soft sheet before covering with tissue. The covering should have at least three coats of dope for waterproofing. The floats are joined at stations "B" and "F" with 1/8" x 1/2" x 8 1/4" pieces of hard balsa sandpapered to an airfoil shape and covered with tissue.

Wing

The wing construction is similar to that of the tail surfaces. Draw the full sized layout, spacing the ribs 1-1/16". The trailing edge is straight to give the centre of pressure line a sweepback angle. Lay down the complete outline, blocking up the front of the trailing edge 1/16" to allow for the under camber of the airfoil. Cement the bamboo tips in place. When dry, raise the leading edge and add the ribs and spars. After thirty minutes of drying pin the centre section down to the bench and crack the spars for dihedral, blocking each tip up 3". Let these joints dry overnight if possible. Sandpaper the leading and trailing edges to shape. Cover the centre section and leading edge with 1/32" soft sheet, holding it in place with small pins until dry. Sandpaper the wing lightly all over. The tissue covering should be applied with the grain parallel to the ribs. Water spray and give two coats of dope. Cement small hooks to the centre section so that the wing may be

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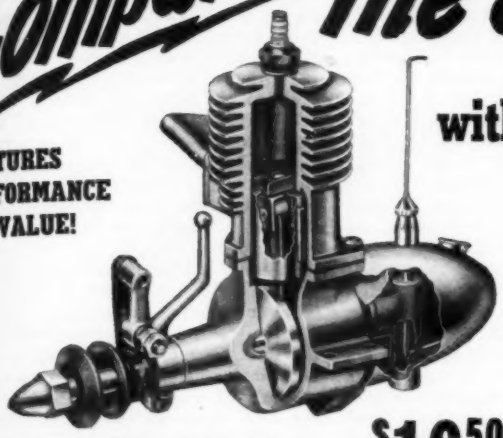

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held to the fuselage with rubber bands. Do not block up the leading edge as the correct incidence has already been built into the wing mount on the fuselage.

Propeller and Power

The propeller is carved from a medium hard block of balsa measuring 14" x 1 3/8" x 1 3/4". Taper to the dimensions given on Plate 2. Carve with about 3/32" under camber. Round off the corners, sandpaper smooth, balance and cover with tissue. The freewheeling device is detailed on Plate 1. If the model is to be flown only as a landplane a 15" prop will give slightly better results for contest work.

Power is supplied by 16 strands of 3/16" brown rubber with three or four inches of slack to bring the weight up to the required minimum of four ounces. The weight of the author's model as a landplane, less rubber, was 2 1/2 ounces. The floats added 8/10 ounce to this figure.

The model is now complete except for the small cover over the centre section. This is left to the last since the centre of gravity must be determined to get the wing in position. Assemble the landplane completely and move the wing until the centre of gravity is 2 1/2" back of the leading edge at the centre section. The floats will move the C. G. ahead about 1/4" but this can be counteracted by giving the stabilizer a negative angle of about one degree.

To build the cover, pin formers 4a and 7a in position. Add the stringers and fill in the corners with 1/16" scraps, cementing them to the wing centre section as well as to formers 4a and 7a. Now cover and dope in the usual manner and the model is ready to fly.

Flying

It is preferable to make the first test flights using the wheels. Adjust the rudder and thrust line until a slow right turn is obtained, both under power and in the glide. When the floats are installed try a few hand-launched flights over tall grass until satisfied that it is flying properly.

Now test it on the water. Start with about 50 to 100 turns and vary the float position and incidence until the model skims along the water in a right turn of the same diameter as that in which it flies. When launching, wind fully so that the model will jump off quickly. Let the prop pick up full speed before releasing the fuselage. Do not attempt to fly any seaplane model from small bodies of water with trees, steep banks or other obstructions on the windward side as the slightest breeze will cause sufficient down drafts to make a take-off impossible.

Remember that seaplane models are more difficult to adjust than are the landplane types but if you have the patience to refuse to become discouraged at the first few duckings, you will be well repaid by the pleasant new thrills this unexplored branch of modelling will add to your hobby.

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Frontiers

(Continued from page 29)

France a heavily armed fighter of any value. Therefore it was the destiny of the interceptor to become the most reliable defensive weapon the Allies have. It is a big task for the interceptor and, yes sir, the interceptor pilot is going to be a very busy person for many a day yet to come.

At present the European idea of an interceptor-pursuit has differed widely from our conception. There are good arguments on both sides; but we think the Europeans have the right idea. Most of our pursuits have considerably low wing loadings which means slower speeds but exceptionally good maneuverability. That is a known fact: i.e., the Curtisses versus the Messerschmitts. People who have been at the front persistently tell the same story that if a Frenchman in a Curtiss "75" finds that he has a German Messerschmitt coming at him all he has to do is "mush" his ship (pull it up almost into a stall) and the Messerschmitt goes so fast that the pilot has neither time to fire or change his course. The Frenchman then gives his ship the gun as the German streaks by and "tails" him until his enemy is riddled full of holes; and there is no roll, bank or turn of a Messerschmitt that cannot be surpassed by the Curtiss. Of course this maneuverability factor very much favors the American interceptors, but a country is not going to win a war by staging successful dog fights for the daily entertainment of the citizens down below, nor is an interceptor pilot going to stage a circus performance around a very heavily

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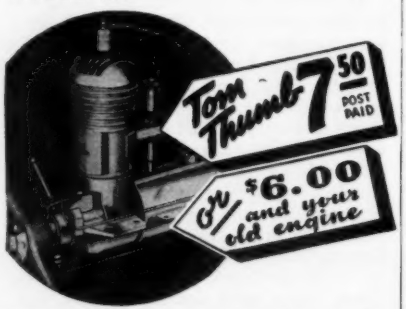

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armed enemy bomber until he or the other is shot to pieces. The other case is then to have a very high speed interceptor that can get at the slower, larger enemy bombers as quickly as possible and get their prey on the first dive or rely on the interceptors that follow to finish the task. This necessary speed means very high wing loadings, and thus the ships would not be very successful, pursuit-against-pursuit, but they would be able to lay their bullets into the attacking bombers and be away again before the bombers knew directly what had happened. That appears to be more important. It is not probable though, that the Germans had even that thought in mind when the high wing loaded Heinkels and Messerschmitts were built: They had neither time nor experience to consider many of the factors other than just building a fast airplane and, in the case of Willie Messerschmitt's job, slots were added to improve flying characteristics so the planes would land right side up. As it is now, there is many a grave filled with men who were killed in the process of landing these "hot" airplanes. Of course the conditions of operating airports also has a lot to do with determining whether an airplane must land slow or fast, and not many of France's fields are in A-1 condition, especially in war time. Nevertheless it seems that the high-speed ship has more in its favor. Germany is certainly depending on it as is France with their Dewoitine. The Dewoitine's wing loading reaches the height of almost 32.5 lb./sq. ft. and if the pilot is good he can slow the ship up to about 70 m.p.h. for a landing. That is plenty hot for a plane that has a wing spread of only 33 feet. Though our pursuits have lower wing loadings we have higher horsepower engines available and still get the same speeds as the Allies. Our large engines have put the weight of our pursuit interceptors mighty high though; approximately 6,000 pounds compared to the Dewoitine's 4,800 pounds. It will take a Dewoitine about 3-1/2 minutes to climb up to meet the enemy, and every minute counts. Thus the pursuit pilot must live the life of a fireman in war time and be ready to hop into his ship on very short notice. The little French pursuits have Hispano-Suiza 12Y engines developing about 1,000 hp. with many more "horses" to be added in the near future. The engines are of the V-12 type and give the airplane a snoot similar to that of the English "Spitfire." An aircraft cannon shoots out the spinner of some of the models and two to four machine guns of the fixed type are used. (Vultee's Vanguard is doing all right with six guns!) It looks like good business for Browning now that Germany has taken over the Madsen gun company in Denmark, one of the chief suppliers of aircraft machine guns and cannon in Europe. Of course Oerlikon, who is close by in Switzerland, may get many of her guns on the Dewoitines before Germany also takes that country over. The only other recognized source for good aircraft armament is from the Breda S.A.F.A.T. Company in Italy, but there is not much hope of the Allies obtaining guns from that country. Our .50 caliber Browning guns are now very much in demand and the Air Corps says that these "heavies" are very much needed on our forthcoming high-speed bombers, especially for single swivel gun mountings such as in the tail of the fuselage.

Aside from the Dewoitine, France's only other formidable fighter is a very similar appearing Morane-Saulnier M.S. 406 that has already received much publicity in this country. While the Dewoitine does 340 m.p.h.; the Morane, with an 850 hp. Hispano engine, does 305 m.p.h. Having a span of 35 feet and a wing loading of 27-1/2 lb./sq. ft. the airplane should do well. However, on one particular skirmish with the enemy in the early stages of the war a squadron of these planes did not fare so well. Whether it was the fault of the airplanes or the circumstances is not known. But we still think the Dewoitine D.520 is the one to watch over in Europe at the present time.

Glenn L. Martin, if reports are true, has a new interceptor pursuit in the making. The Air Corps has had many of its different types of pursuit-interceptors under test at the same time to compare their performances in dog-fights. There were such planes as the P-35, P-36, P-39 and P-40 . . . and the P-36 came out victorious! However, the P-39 for one, was able to outstrip the P-36 in speed.

While Great Britain is ordering her Boulton-Paul "Defiants" in large quantities furnishing her air force with a good two-seater fighter we are also going back to the two-seater fighter. There was a time not so long ago when the only modern pursuit in the U. S. Army Air Corps was a two-seater, the low-wing Consolidateds . . . before that, the Berliner-Joyces. Now we hear that the P-38 of Lockheed's will be a two-seater which seems to be a sensible revision. There is really a bit too much of airplane there for one man.

Some other very important information is that the papers say that North American Aviation, Inc., has a large order from the Allies for an Allison-powered single-place interceptor-pursuit! It will be a humdinger. Douglas now has under test a two-place airplane that apparently, according to its insignia, will be delivered to the U. S. Marines. It is similar to the Northrop BD-2 with the only radical change being the extention of the fin along the top of the fuselage. Did you know that Douglas completed delivery of the first order of French DB-7s way back, last February? Remember we mentioned Vultee's new experimental plane for Pratt & Whitney a short while ago? Well, they plan to use the plane in testing their forthcoming 3,600 hp. engine!

Successful flight demonstrations of a helicopter built by the Vought-Sikorsky Aircraft division of United Aircraft Corporation were made recently at the Vought-Sikorsky factory in Stratford, Connecticut. Piloted by Igor I. Sikorsky, the helicopter rose vertically approximately 30 feet, hovered motionless over one spot, and then flew approximately 200 feet across the field before descending vertically to the ground. Several additional short flights were made to demonstrate the craft's ability to rise, hover, travel in any direction and turn in flight under complete control by the pilot.

Mr. Sikorsky, who is Engineering Manager of Vought-Sikorsky Aircraft, stressed the fact that the helicopter is still in an experimental stage, but said that the flights had clearly demonstrated that the problems

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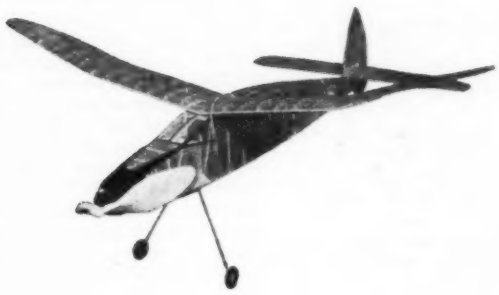

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which have balked helicoper designers for years had been successfully solved.

General Dimensions of the Vought-Sikorsky VS-300 Helicopter

1. Diameter of the main rotor.....28 ft.
2. R.P.M. of the main rotor.....255 r.p.m.
3. Diameter of the auxiliary rotors....6' 8"
4. R.P.M. of auxiliary rotors....1700 r.p.m.
5. Gross Weight.....1150 lbs.
6. Engine—4 cylinder Lycoming....75 HP.
7. Power Loading.....15.3 lbs.

*8. Main rotor blade loading—average .....51 lbs./sq.ft.

*9. Disc. loading.....186 lbs./sq.ft.

The Engineering and Research Corporation of Riverdale, Maryland, announces that after three years of intensive research and development, their ERCOUPE airplane has reached the production stage.

ERCOUPES ailerons, rudder and nose wheel are all mechanically coordinated so that turning is accomplished in the air, as it is on the ground, by turning the control wheel right or left—just the same as driving an automobile. ERCOUPES tricycle landing gear eliminates the hazard of ground looping or nose overs.

Operation of the ERCOUPE is so simple that it is believed that four hours training will represent maximum instruction requirements for solo.

Building the Falcon

(Continued from page 31)

bulkheads down should now be removed and transferred to the main planks, as they can not be removed later when the fuselage has been entirely planked. A triangle should be used now to make sure that all bulkheads are at right angles to the board, especially bulkhead 1.

The fuselage planking may be started now. The planking strips should be very soft and light for best results. Pin each strip to every bulkhead and use slightly thinned out cement to join the planks to each other and to the bulkheads. Plank alternate sides, not one side first and then the other. It will be necessary to taper the planks at the rear, since the fuselage is narrower there. Accuracy is not very important here as a hole can be plugged up with scrap wood and sanded down later. The fuselage should be left aside now to allow the cement to dry properly.

After removing the bottom half of the fuselage from the workbench, cement the top parts of each bulkhead in place. The top part of the fuselage should now be planked. Trim away the planking behind the top part of bulkhead 8 to allow the mounting of the stabilizer mount block. All the planking behind bulkhead 10 is now trimmed away and the tail fillet block cemented in place. After the cement has dried, these blocks can be carved and sanded to shape, but for the present, lay the work aside and allow it to dry.

The motor unit is next on the program. Figure 1 on the half-page drawing shows the first step. The rear ends of the hardwood engine bearers should be flush with the rear end of the 1/8" sheet hard balsa base. The outside edges should be flush with the sides of the 1/8" sheet. Bulkhead 1A should be cut to shape and cemented in place now, reinforced by two gussets in the rear as shown in Fig. 2A. The landing gear strut is now bent, as shown in the plans, and cemented in place. The top of the strut should be flush with the bottom edges of the engine bearers.

A new and light method of mounting landing gear struts on plywood has been evolved. Holes are drilled on each side of the wire when it has been cemented in place, and then fine copper wire is used to "sew" the wire to the plywood bulkhead. Two or three heavy coats of cement complete the landing gear mounting. The bottom ends of the struts are now pulled apart and the airwheel is mounted. Note that an inverted "U" wire piece is bound to the landing gear struts to keep them together in a "hot" landing. Figures 3 and 4 should clarify the cowling problem. Although an enclosed cowling may be used, the one illustrated is preferred since servicing and adjustments can be made so much easier.

The timer can be located in any position on the cowl, but the original was mounted in a hole carved into the cowl to accommodate the clockwork timer that was used. A compressed air type was also mounted at a later date and worked well.

The engine is now mounted so that the lengths of the hook-up wire may be determined. The coil is mounted directly behind 1A, and a hole is cut into the 1/8" sheet to accommodate it. After soldering longer leads to the coil, cement it in place. The condenser should be mounted somewhere inside the cowling, so that it will be near the ignition points for better electrical efficiency. A battery box is now constructed according to the dimensions given in the plans, but it is not cemented into place between the inner rear faces of the engine bearers. This will have to wait until test hops are made, when the position of the battery box may have to be changed. The engine is now removed to allow the cowl to be sanded, covered with silk and doped enough to make it oil-proof.

The stabilizer is so simple that a beginner without any experience at all could make it without trouble. All ribs are given on the full size rib drawing. All that is necessary is to lay out a line on a board and mark off 16 spaces of 1-3/8" each at right angles to this line. Pin a 1/4" x 3/8" spar to the line first

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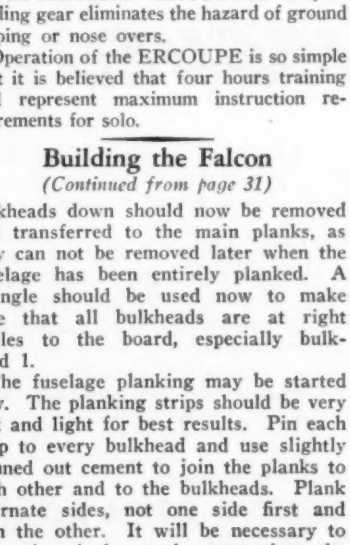

SCIENTIFIC MODEL AIRPLANE CO.
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mentioned, followed by the ribs in their proper places.

Leading and trailing edges are now cemented in place and allowed to dry before trimming and sanding to airfoil shape. A sheet 6" wide is prepared from two 3" widths of 3/16" stock, from which the rudders are cut. A graph of 1" squares is drawn with soft pencil onto the sheet, after which the curves are copied from the drawing. Be sure to cover and dope the stabilizer before mounting the rudders, as covering is difficult with the rudders in place. Although not shown, tailskids should be fitted to the rudders to prevent wear at this point.

A full size wing plan will have to be drawn in order to obtain the shape of the trailing edge parts. The drawing given is 1/4-full size, so any dimensions needed can be obtained by multiplying the dimension on the plans by four. After all the ribs, spar joiners and both spars have been cut out, they may be assembled on a flat surface. Be sure to use very soft balsa for the leading edge, as it must be bent to shape. If 1/2" x 3/4" stock is unavailable, two 1/4" x 3/4" strips may be used, one in front of the other. After propping up each wing panel about 6", the wing spar joiners should be cemented in place. The wing is now either double tissue, bamboo paper, or silk-covered. Do not forget to cement or dope the covering to the undercamber on the ribs. Spray one wing panel and lay the wing down on a flat surface so that the sprayed panel may be weighted down to prevent it from warping when drying. Ditto for the other panel. Use a wide brush in doping the wing in order not to leave streaks or brush marks.

Two wing mount pieces are cut out of 1/4" sheet as per the full size outline in the drawing. Both are cemented together on the bottom of the wing at the dihedral joint. Take care and see that they are not cemented onto the wing. With the incidence block in place, the wing mount should be cemented in place, braced on each side with 1/4" square balsa strips cemented in place. Tie the wing and stabilizer in place with rubber to check the line-up. If either wing tip droops in relation to the stabilizer when viewed from the front, change the 1/4" square strips until the line-up is true. The wing mount planking strips are applied vertically in short lengths.

The fuselage and wing mount may be sanded now, followed by doping and application of silk or narrow strips of tissue. (Silk preferred.) In sanding, use a block with the sandpaper in order to remove ridges in the planking.

Notes on Finishing

The model should first be clear doped, followed by a coat of light colored dope. Carborundum Wet-or-Dry 320-A waterproof sandpaper should be used now, in conjunction with water. The second coat of colored dope is now applied, and it should be diluted with a bit of thinner. If the equipment is available, the dope should be sprayed on. Use Wet-or-Dry 400-A from this coat on, and use plenty of water. Do not press hard when sanding, as the idea is not to wear away all the dope you have put on, but to brush off all minute ridges and to fill up the pores of the wood or silk. A third coat is brushed or sprayed on now, without being sanded. Allow this coat to dry well, then mask off the desired areas with Scotch Masking Tape. A small three-view with a suggested color scheme and outline is given in this article, but many will prefer to use their own ideas as to striping, scallops, etc. After two or three coats of the dark colored dope with intermediate sanding, the model should be left to dry overnight so that the dope will really harden. Simonize or some other polishing compound is then used according to the directions on the can.

Notes on Testing

For testing try to do the work in a large grassy field. Also try to have someone else along to catch the model if you launch it too hard in glide testing it. The first thing to do is to check the center of gravity. The model should balance in a level position when supported 1/2" behind the spar near the wing mount. In other words, the C.G. should be about 4 3/4" behind the leading edge of the wing. From a crouching position, heave the model away in a horizontal path. You will probably launch the model too slowly the first time, so do it again.

Make sure that the model attains flying speed this time. If it "mushes," remove the engine unit and move the battery box forward. If it dives, move the battery

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1/8x1/8 ..... 30c
1/8x3/16 ..... 50c
1/8x1/4 ..... 55c
1/8x3/8 ..... 65c
3/16x3/16 ..... 50c
3/16x1/4 ..... 60c
1/4x1/4 ..... 85c

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1/64x2, 10 for 20c
1/32x2, 10 for 15c
1/16x2, 10 for 18c
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1/8x2, 10 for 23c
3/16x2, 10 for 32c
1/4x2, 10 for 42c
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If 3" widths are desired, double price of 2" widths

BALSA PLANKS 36" Lengths
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1x1½, each 9c
1x2, each 15c
1x3, each 20c
1x6, each 35c
1½x1½, each .25c
2x2, each 25c
2x3, each 35c

CLEARCEMENT
1 oz. bot. dx. 40c
2 oz. bot. dx. 65c
1 pt. 40c 1 qt. 65c
1 gal. 1.75

CLEAR DOPE
1 oz. ..... doz. 30c
2 oz. ..... doz. 60c
1 pt. 35c 1 qt. 60c
1 gal. each $1.50
Thinner & Banana Oil same price

COL'RED DOPE All Colors
1 oz. bot. dx. 50c
2 oz. bot. dx. 75c
1 pt. 40c 1 qt. 70c

Silkspan Tissue
White, doz. 17c
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BEST BAMBOO
1/16x¼x15 dz. 8c
1/16sq.x12 gr. 10c

MACHINE CUT PROPS, per doz.
5" ..20c 6" ..21c
7" ..30c 8" ..35c
10" ..43c 12" ..60c

M & M AIR WHEELS
(For rubber powered models)
per pr.
1¼"-1¾"-1½" ..... .38
1⅞"-2"-2⅛" ..... .40
2¼" ..... .45
2⅜"-2½"-2¾" ..... .45

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225 ft. skeins
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Per lb. $1.20

WASHERS
¼ or ⅛, 100 8c
Shafts or Rear Hooks ..... doz. 6c

SHEET ALUM.
.002 thick, 5" 25c
.005 thick, 5" 50c
.010 thick, 5" 75c

ALUM. TUBING
1/16 O.D., 5" 28c
3/32 O.D., 5" 28c
⅛ O.D., 5" 30c
¼ O.D., 5" 42c

WIRE, per 100 ft.
Straight Lengths
No. 8 ..... 22c
No. 8 ..... 27c
No. 12 ..... 32c
No. 14 ..... 37c

BRASS BUSHINGS
1/16 dia., 100 12c
3/32 dia., 100 13c
⅛ dia., 100 18c

SHEET CELLULOID
12½x16, ea. 19c
6x8, doz. 85c

SPRING STEEL WIRE
(In five (5) foot Length)
1/16 dia. .....
..25 ft. for .25
3/32 dia. .....
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2 pair for 3.30
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3 pair for 3.90

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MODEL AIRPLANES—KITS—SUPPLIES

1940 GMS catalogue lists "Everything for Gas Models." Airplanes — Boats — Race Cars—Motors—Supplies. Gas Model Specialties, 128 W. Washington, Syracuse, N.Y.

BROWN AERO RUBBER—Hodgman Rubber Company, 261 Fifth Avenue, New York City. Chicago Office: 412 South Wells Street. Dealers and manufacturers only.

SMALL weekly payments on motors, kits, supplies. Send 10c for details and catalogue. American Aircraft Supply, 890 Grand Avenue, New Haven, Connecticut.

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GAS PROPS. 8" to 14", 7 for $1.10 postpaid. Waxed gumwood props 8" to 16", 4 for $1.10 postpaid. Pegler's Hobbycraft, 122 Third Ave. W., Duluth, Minn.

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DEALERS, Clubs Schools: Send for low, complete wholesale list, including gas model supplies. Save money. Montauk Model Aircraft Co., 4320 16th Avenue, Brooklyn, N.Y.

ATTENTION Dealers: One source for all of your needs spells savings. Latest kits and supplies available. Arrow, 2220 Montclair, Cleveland, Ohio.

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ROLL DEVELOPED, 16 Artistic Deckled Edged Permanent Prints, 25c. Reprints, 3c each. 100 Reprints, $1.50. "As Reliable As Uncle Sam's Mail!" Midwest Photo, Room 524, Janesville, Wis.

box backward. If the stall or dive is very persistent, then the stabilizer incidence will have to be increased or decreased. As soon as the glide is halfway decent, try an overhead launch in order to get a longer glide and to see if the model circles. Adjust the model to circle slightly to the right.

The first power hop should be made with the engine revving at the speed when it no longer "four cycles," but starts to "two cycle." (At this point the "chug-chug" changes to a whine.) In any case, don't let the model go with the engine just "ticking over," as the engine can cut out too easily at low revs. Don't let the model go with the engine wide open either, as it will be all over before you get a chance to see what has gone on.

Always hand-launch the model on test flights, as you give it additional altitude to recover if it stalls. If the model dives, it will merely make a "hot" landing. At this point it would help to have your assistant around, as gas models do funny things on their first power hops, due to unseen thrust offsets. Give the motor 10-15 seconds run, so you can get a chance to get under the model if something is wrong. A short engine run and a stall near the ground may mean a day at home repairing the model, so watch out. Correct any bugs now and give the motor a few more revs on the next flight.

Now that the model really gets some altitude, you can observe the climb and glide and make the necessary adjustments. Don't change the C.G., wing, stabilizer, or rudder adjustments at all once the model has been adjusted for a good glide. The power portion of the flight should be controlled with motor offset. Happy landings!

Contest Notes

If the "Falcon" is flown at a contest under N.A.A. rules, the following weights will have to be exceeded.

Since the wing area of the "Falcon" is 4 sq. ft., the minimum weight for contest flying should be 2 lbs. plus, in order to exceed the 8 oz. per sq. ft. minimum ruling.

With a Baby Cyclone (.363 cu. in. disp.) the minimum weight is 29 oz., but since the above wing loading has to be met, a 2 lbs. plus total weight will be required.

With a Gwin Aero or Mighty Midget (.45 cu. in. disp.), the minimum weight will have to be 2 lbs. 4 oz.

With a Hurlemann (.488 cu. in. disp.) or O. K. 49 (.49 cu. in.) the minimum weight will have to be 2 lbs. 8 oz.

All of the above mentioned motors are ideally suited to power the "Falcon" for sport or contest flying.

Flash News

(Continued from page 35)

mittee, composed of the heads of the various branches of the nations flying force, cited the tall, lean Texan "for his skillful use of high-speed long-range aircraft and advanced methods of aerial navigation."

Republic Aviation will close their entire plant at Farmingdale, L.I., for 10 days, from Aug. 24th to Sept. 3rd in order to give their employees simultaneous vacations this year. More than 1,700 employees are utilized to turn out the single and two-place fighting ships, formerly known as Seversky.

One hundred horsepower per cylinder is the achievement of the new Lycoming 0-1230 twelve cylinder "flat" engine. With a maximum output of 1,200 horse power, the entire engine weighs only 1,325 pounds. It will be used by the army air corps for "in-a-wing" experimental installations.

An additional $527,517 contract has been awarded the Stinson Aircraft Division of Aviation Manufacturing Corporation covering changes in the construction of the model XO-49 observation monoplanes. The original contract called for an expenditure of $1,500,000 and work is nearing completion on the first group of three ships. Latest addition to the Aviation Manufacturing Corporation's family is the Barkley-Grow concern which has just been purchased.

Additions which will add 75% more floor space to the already huge plant of the Boeing Aircraft Co. of Seattle, Washington, have been contracted for. This new space and equipment will be used to manufacture under license the $23,000,000 worth of Douglas DB-7 attack-bombers for the British Purchasing Mission and the United States Army Air Corps.

Some figures on the Canadian part in wartime aviation have been released by the British Air Ministry: Canada will produce 1028 airplanes in 1940; 1583 in 1941, and will be of two types: Hawker Hurricanes and Bristol Blenhiems. There are at present 1389 officers and 10,926 enlisted men in the Royal Canadian Air Force.

Information that you may have use for: Vought has just brought out their new XF4U-1 low-gull-wing fighter. Powered by a PW 1800 h.p. engine it is said that she can do 400 m.p.h. Resembles the Brewster F2A-1 greatly excepting for the wings which are unusual. (Has the cleaned-up lines of the Brewster, being longer.) . . . They have had trouble with the first two test flights. The trimming tab on the elevator broke loose twice, due to vibrations. Now is back in the shop for "bug-hunting."

Pan American Airways announced daily plane service to Argentina and weekly service over the eight thousand mile route from San Francisco to Australia. The huge Boeing Clipper and Martin Clipper will alternate over the distant route. Main factor in the inauguration of the Argentina schedule was the President's policy to bring together the 21 republics of the Pan-American Union.

Major James H. Doolittle, former speed record holder, manager of Shell Oil Company's Aviation Department and present President of the Institute of Aeronautical Sciences, was recently ordered back to a year's active duty with the United States Army Air Corps.

Final dismissal of negotiations between Henry Ford and the British Purchasing Mission in which Ford was to manufacture one thousand Rolls-Royce 1150-hp. motors daily, has been concluded with the final announcement by the motor tycoon that he "will build no motors for other than this nation's defence." Many had doubted that Ford could attain that production figure.

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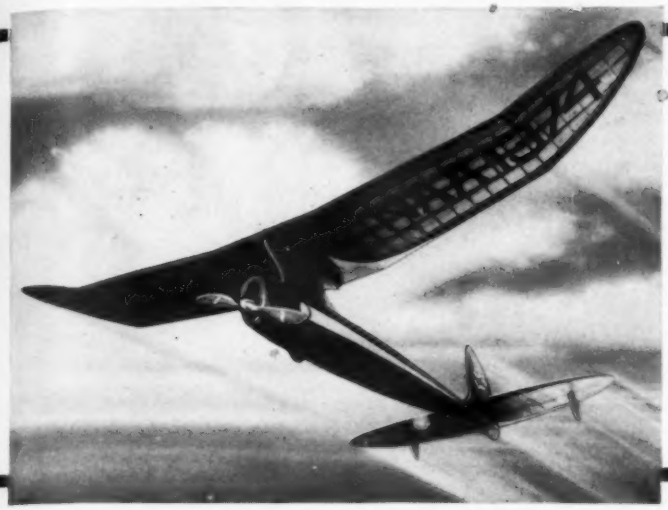

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The **SAILPLANE** — **CARL GOLDBERG'S Latest and Greatest Gas Model Achievement!**

Although the Sailplane was announced too late to enable it to be fully represented during the Nationals, it is already demonstrating its ability to reach new heights of performance, with its absolutely terrific climb, and amazing sailplane glide. Winford Davis, Kansas City, Missouri, won the Missouri State Championship in the "C" Class, with his Sailplane, and Rodney Q. Selby of Des Moines, Iowa, took first prize in Class "C" competition at the Des Moines, Iowa contest on June 29th! Look for big things to come from the Sailplane—and ask your dealer about the Sailplane ($5.95) and other famous Comet Gas Models—the Zipper ($3.95), the Mercury ($2.95), the Clipper ($4.95), and the Zipper "A" ($1.50). (Postage extra; no postage if ordered from dealer).

Comet extends congratulations to the model builders who made their marks at the Chicago Nationals! Once more, Comet Gas Models demonstrated the soundness of Carl Goldberg's designing skill—with the Comet Zipper holding the spotlight! It was a great meet—and Comet was glad to be host to the many who visited the Comet plant during the Nationals!

WINNERS WITH COMET MODELS AT 1940 NATIONALS!

First Places	Class A—Junior	R. Lieber, Philadelphia, Pa.	Mercury
	Class B—Junior	L. Maze, Jr., St. Louis, Mo.	Zipper
	Class B—Senior	B. Redecker, Cincinnati, Ohio	Zipper
	Class C—Senior	J. Leiendecker, Ft. Wayne, Ind.	Zipper
Second Places	Class B—Junior	D. Lyons, Jr., Libertyville, Ill.	Mercury
	Class B—Senior	B. Wright, Topeka, Kans.	Mercury
	Class C—Junior	B. Hinshaw, Topeka, Kans.	Zipper
	Class C—Open	S. Hackenberg, Kansas City, Mo.	Sailplane
Third Places	Class A—Senior	R. Hartman, Norwood, Ohio	Mercury
	Class B—Open	C. Keeling, Louisville, Ky.	Zipper

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Next month Ohlsson's advertisement will carry a complete list of Ohlsson-powered winners at the Nationals.

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